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THE relations of the New York, New Haven & Hartford to the Pennsylvania and the New York Central, have long been a subject of comment and speculation. They are especially worth watching now. It will not escape attention that there have recently been three progressive steps in New York Central—New Haven affiliation. The two companies have joined forces in equal ownership and control of the Rutland Railroad; they have arranged for New Haven train service on subsidiary lines of the Boston & Albany; and now comes the announcement that the New Haven is to withdraw three of its heavy passenger trains each way between New York, Portland and Bar Harbor from the New London—Worcester route and shift them to the Boston & Albany route via Springfield and Worcester—the New Haven thus surrendering its own long haul for the benefit of the Boston & Albany, which is leased by the New York Central and has of late years been burdened by a deficit. As to the Pennsylvania, it may be noted that the long deferred ground breaking has begun for the line connecting with the New Haven via Hell Gate and its prospective big bridge, a plan presumably not heretofore viewed by the New York Central interests with unalloyed satisfaction. We may also note the representation of the two other companies in the New Haven's directorate, and considerable direct and indirect holdings by them of its shares. While general tendencies have of late years been toward an equalization of New York Central-Pennsylvania relations with the New Haven in recent affiliations the New York Central is visibly ahead.

THE legislature of Indiana has decreed that old freight cars shall not be used for passenger station purposes. This is a bit of thoughtful consideration of the wishes of a long suffering public that almost warrants one in forgiving the legislature for some of its other activities during the past winter. However, it takes a whole newspaper broadside to print, in fine type, those new laws which affect railways, so that if we were to try to strike a balance we should be forced to conclude that the abolition of the freight car waiting room had been bought at a costly figure. The numerous new laws affecting carriers were abstracted in our issue of April 7, page 829. Three of them have to do with the elevation of tracks and the abolition of grade crossings in particular cities—Indianapolis, Ft. Wayne and South Bend; two are employers' liability bills affecting other employers, as well as railways, and one or two are aimed particularly at electric lines, but all the rest in the long list are aimed at the steam railways alone. These railways employ thousands of trainmen, enginemen, firemen, conductors and telegraphers; these employees are banded in brotherhoods which have the attentive ear of every legislator, night and day, and the brotherhood leaders think that one of the most useful works to which they can devote their time is to tell the legislature how to run the railways; and so we have laws on any and every subject concerning which a freight brakeman happens to think that there ought to be a change in practice. As shown last week (page 869), almost 500 bills to regulate operating matters have been introduced in the various legislatures this year. The first impression made on the reader by an examination of these Indiana statutes which were abstracted by us last week, page 829, is that some one person drafted at least three-quarters of them, and that he got them adopted without any serious discussion of their merits. In many cases the requirements are in line with good practice, and the requirement itself is not subject to criticism; but the question of the ultimate effect of this kind of legislation is one which should be seriously considered. If the best way to settle the question of the number of water closets needed in a station which accommodates 4,800 inhabitants is to refer it to a hundred legislators who have never studied that branch of railway economics and sociology, it is time to inquire whether the railway profession is fulfilling its proper function—or whether, indeed, it any longer has any proper function.

JUDGE COOLEY, the first chairman of the Interstate Commerce Commission, in his work on Torts, remarked that Anglo-Saxon peoples had always left a large amount of freedom of action to all classes of persons, "justly considering"—as he said—"that *it is safer to allow too much liberty than to impose too much restraint.*" (The italics are ours.) Such legislation as that in Indiana, Missouri and other states shows that we are rapidly drifting away from that Anglo-Saxon notion of good government. How far in the opposite direction are we going? Are we going to keep on until all the details of business activity are regulated as they were in France just

before the revolution? The conditions in that country at that time the German historian, von Holst, has described in the following striking language: "As the government charged itself with attending to everything it was, of course, held responsible for everything. Commanding, instructing, or at least advising, in regard to everything, was it not also its duty to foresee everything up to the fancies of fashion, the whims of trade, the freaks of the weather? The government became the terrestrial Providence. One of the attributes of Providence is omnipresence. If we merely look at the intendants and their subordinates, who did nearly all the real governing, we get but a very inadequate idea of how far government under the ancient régime came up to this requirement. There was such an innumerable host of all sorts of public officials that one is tempted to say that whatever a man did he was almost as sure to have some kind of a public functionary at his side as he was to be followed by his own shadow. If the peasant brought an ox to market the inspector of cattle presented himself; the inspector of calves looked after the calves; the inspector of swine took care of the pigs; and if it happened to be a sow with young he was joined by the inspector of sucking pigs." Robert Mather, on one occasion, after quoting this passage from von Holst in a speech, concluded with the words: "God save us from the inspector of sucking pigs!" Present indications are that this prayer will not be answered.

THAT the attitude of the federal government and of the states toward the railway corporations has had an adverse influence on the value of railway securities it would be idle to deny. But practically one would expect that railway stocks rather than bonds would reflect the attack. One might even go further and reason theoretically that bonds—referring of course, to the bonds of solvent and dividend paying roads—would be positively benefited by the transfer of investment from shares to the senior and underlying securities. Railway bonds, under the continuous "baiting" have not, for obvious reasons connected with their higher security, suffered like railway shares. But they have suffered considerably and to an amount which may be estimated at from a quarter to one-half per cent. in their interest return. That is to say the average railway corporation borrowing must pay that increased rate annually for its money, and that too during a period of very low rates for money on call. Three causes appear most prominent in what may justly be called this unnatural depression of the railway bond of good security. One cause is psychological and lies in the idea that the distrustful investor has probably let his timidity as to railway shares extend to bonds also. The second cause is to some extent a corollary of the first, namely the expansion of the investment field outside of railways, notably to tractions, power, electric light and water companies, corporations much less subject to attack than the large interstate railway systems; and the third cause is the influence of federal and state action on the foreign demand for the American railway security. In the order of importance very likely these three causes might be inverted in their order of statement. Certainly no fact is writ larger before the foreign investor than governmental policy toward investment. He seeks a place for his funds in the countries outside his own where not only are law and order dominant, but the policy of public authority as to the vested private fund conservative, restrained, *definite*. How far does our national policy and procedure during the last few years square with those basic conditions of our foreign railway credit?

THE controversy among signal engineers on the subject of signal aspects, which has been a general annoyance for the last two years, seems now on the road to settlement. The failure to settle it long before now must have been due to the confused or incomplete presentation of the facts and arguments, and this fault is now mainly or wholly cured by the paper of Mr. Clausen, printed in our issue of March 10, and that of Mr. Rudd, printed today. For the issue has been simple, after all. Messrs. Stevens and Clausen have been fighting for the minimum of signaling, while Mr. Rudd and his backers demand all the signaling that can be *profitably used*. Probably the critics of the majority would assert that we are wrong in italicizing that adverb; that the idealists have ignored economy and do not deserve that degree of commendation. But the cold facts of experience may be depended on to settle that point. However this may be, the fact remains that the less information the signals give to the enginemen the more must he use his "judgment," or guess, *unless* he reduces speed. No signal engineer is going to admit the propriety of guessing, and when fixed signals are introduced the exercise of "judgment" is abolished. It is very distasteful to the "old guard" to admit that fixed signals make this radical change; but they do make it, all the same. So the real controversy is on the question, Shall we expand our signal system so as to admit of the highest speeds and eliminate all unnecessary stops? Mr. Rudd aims to do this. Mr. Clausen holds that it is unnecessary. Again, it is to be observed that the question of economy will take care of itself. Mr. Rudd says that his system is already in successful use. If it does not provide what the railways want its use will not extend. On the question whether a poor road may omit parts of the elaborate system, and still be consistent with the big roads, the committee seems also to have made good. Unfortunately men's minds seem to be incapable of settling questions like this—and questions far less obscure—by logic alone, so we must wait for the slow process of trial; but, as we have intimated, the essential issue should now be clear enough to enable any one who wishes to decide it for himself to do so readily.

ONE point in which we think the minority is weak has not been sufficiently emphasized in any of the discussions, and not even by Mr. Rudd. He touches on it where he says "there is no doubt that they all mean stop." Not only this; those stop aspects mean nothing else. The three aspects may fairly be called one single aspect. The stop signal is always the same; a horizontal arm or a red light; "the same kind you have always bought," as the patent medicine man says. The alleged differences may be correctly described as minor modifications; for they are not only minor, but are entirely negligible, *until speed has been reduced*. After the speed of a train has been brought under control all questions of signal aspects become simple, for the runner can then take time to think. It cannot be too often reiterated that the signal problem is the problem of providing for high speeds. The present controversy should be a controversy between superintendents rather than between signal engineers, for the main question ought to be settled by those men (controlled by the superintendent) who use the aspects, not by those who make them. A dozen superintendents ought to take an active hand in the discussion, and present the testimony of a hundred of the best enginemen. The Pennsylvania some time ago published the testimony of its enginemen in favor of the three-position signal; but a single exhibit is not enough. Moreover, the testimony of enginemen ought to be scientifically prepared and collated. It would be the easiest thing in the world to gather a lot of such testimony and on analysis find it worthless. If the superintendents do not come to the front the Railway Signal Association should encourage enginemen to tell their views. A prize of $200 would bring to light one or more enginemen who would illuminate the aspect question in a way different from any yet seen. We have had a great deal of talk about the complication of the engineman's task; perhaps we might hear something about its simplicity. The terrors of the night have been expatiated on at length, and yet night signals in some respects are simpler than day signals. The problem with which the runner of a fast train has to deal at night is called complicated, but it is not; it is simple, namely—

To run at unlimited speed, I must see a green light at the top of the signal post.

To simplify the task of instructing enginemen, this might be amplified into three paragraphs, as follows:

1. To run at unlimited speed, I must see a green light at the top of the post.
2. Anything else must limit my speed.
3. If I am in doubt whether or not it is the top of the post that I see, I must reduce speed until the doubt is removed.

Notwithstanding the interminable discussions of difficulties the fact remains that large numbers of enginemen are running at high speeds every night in the year, and making, so far as the public can see, very fine records. It is not safe to assume that these fine records are in all cases due to favoring circumstances, and it is greatly to be desired that the art or knack by which they are accomplished be made public.

MINNESOTA RATE CASE DECISION.

WE give elsewhere an abstract of the decision rendered by Judge Sanborn of the United States circuit court on April 8 in the Minnesota rate case. There were involved both passenger rates and class and commodity freight rates, which had been fixed some by the state legislature, and some by the commission. Charles E. Otis, the master in chancery who took the evidence, made a report a few months ago in which he held the rates unconstitutional, both because they interfered with interstate commerce and because they were confiscatory. His report was regarded even by railway men as so favorable to the road that it might not be upheld. The circuit court has completely upheld it. The case will go to the Supreme Court. Its decision, if it sustains the circuit court, will mark an epoch in the history of railway regulation.

The vital points involved are whether the rates fixed by the state unconstitutionally interfere with interstate commerce, and whether they are confiscatory. The evidence showed that both the freight and passenger rates prescribed were lower than corresponding interstate rates, and that their direct and necessary effect was to make the railways reduce the latter. Otherwise they would unfairly discriminate against interstate commerce. The state of Minnesota contended that this did not necessarily make its action an unconstitutional interference with interstate commerce. It said it had a right to prescribe reasonable state rates, and that it could not be forbidden to exercise the power because this might force a reduction of interstate rates. The railways replied that the power of the federal government to regulate interstate commerce was supreme; that whatever interstate rate is permitted to be charged it must be presumed to deem reasonable; and that the inferior authority of the state can not be used to nullify the superior authority of the nation. Judge Sanborn upholds the contention that any reduction of state rates which has the direct and necessary effect of reducing interstate rates is unconstitutional. This does not entirely deprive the states of the rate-making power. "To the extent that it does not substantially burden or regulate interstate commerce," says Judge Sanborn, "a state may regulate intrastate commerce and the fares and rates therein within its border, but no further. It may enforce regulations of intrastate commerce and its fares and rates which only incidentally or remotely affect interstate commerce, but state laws, orders and regulations concerning intrastate commerce or the fares or rates thereon which substantially burden or regulate interstate commerce or the fares or rates therein beyond the powers of the state are unconstitutional and void."

The decision passes most directly on the basis on which the "fair return" to which the railway is entitled must be computed and the percentage of this return. The Minnesota Railway Commission finished a valuation of railways in 1908. (See *Railway Age Gazette*, February 5, 1909.) It made practically four appraisals: estimate A, cost of reproduction new; estimate A, present value; estimate B, cost of reproduction new; and estimate B, present value. The main difference between estimates A and B was that in the former the appraisal of land was based on what it would now cost railways to get it for railway purposes, while in estimate B it was based on the so-called market value of the land—that is, its value for other than railway purposes. The commission regarded estimate B as the correct valuation. The *Railway Age Gazette* contended then, and the court now holds, that the valuation must be based on the cost of reproduction for railway purposes. Commissioner Lane of the Interstate Commerce Commission, in the western rate advance case, seems to contend that the valuation of a railway should not include its so-called unearned increment. Judge Sanborn holds the cost of reproduction new as the proper basis of valuation. This means that the unearned increment must be included. That the Supreme Court will sustain him is indicated by the following language used by it in the case of Wilcox vs. Consolidated Gas Company (212 U. S. 19, 41, 52): "And we concur with the court below in holding that the value of the property is to be determined as of the time when the inquiry is made regarding rates. If the property which legally enters into the consideration of the question of rates has increased in value since it was acquired the company is entitled to the benefit of such increase."

The percentage of return to which Judge Sanborn held the railways of Minnesota are entitled on their valuation is 7 per cent. The Supreme Court in the Consolidated Gas Company case said the risk in the investment in a gas company is reduced almost to a minimum, and that the court regarded this as the most favorable gas situation in America. Six per cent. was the return ordinarily sought and obtained on investments of that degree of safety in the city of New York. "Taking all the facts into consideration, we concur with the court below on this question and think complainant is entitled to 6 per cent. on the fair value of its property devoted to the public use." Now, the risk of investment in railways is greater than in gas companies. The average rate of return on investments in Minnesota, where the railways in question operate, is higher than it is in New York. Therefore, 7 per cent. on the cost of reproducing the railways of Minnesota would be no more, and probably would be less, than 6 per cent. on the cost of reproducing the plant of the Consolidated Gas Company.

The purpose of the people and legislature of Minnesota was to reduce the profits of the railways. They were egged on to the assault by a lot of politicians seeking thereby to further their own ambitions. The result, if the decision of the circuit court is upheld, will be not to reduce the earnings or the rates of the railways, but to give them the authority of the courts to increase both. Neither their rates nor their earnings were as high when the state sought to reduce them as the decision in this case will permit them to be made. This is not the first time that attempts to confiscate private property in the United States have proved boomerangs, nor will it be the last.

The decision has a lesson not only for the state legislatures and commissions, but for Congress and the Interstate Commerce Commission. If the principles laid down by Judge Sanborn in this case are correct, then the principles on which the Interstate Commerce Commission decided the rate advance cases are wrong and the railways, beyond any question, had and have, a right to make the advances which the commission forbade.

The full import of the ruling that a railway is entitled to 7 per cent. of its valuation can be realized only when it is considered that, on the average, over half of the capitalization of the railways of the United States is represented by bonds, and less than half by stock. Their total capitalization is almost $60,000 a mile, which probably is somewhat less than their cost of reproduction new. Suppose a railway whose valuation and capitalization are $60,000 a mile, $30,000 of the latter being stock and $30,000 bonds. Seven per cent. net earnings on the total valuation would be $4,200 a mile. Suppose the interest on its bonds is 4 per cent., or $1,200 a mile. This would leave this railway, having a capitalization almost typical of that of the

railways of the United States as a whole, $3,000 a mile, or 10 per cent., for its stock. If it should pay dividends of only 7 per cent. it would have 3 per cent. left to apply to permanent improvements. This would not make practicable the carrying out of the policy advocated by various railway executives, of putting one dollar into permanent improvements for every dollar paid in dividends, but it would permit much closer approximation to it than the Interstate Commerce Commission in the rate advance decisions indicated it was disposed to allow.

EFFICIENCY COMMITTEES ON THE CHICAGO & NORTH WESTERN.

THE operating and maintenance department of the Chicago & North Western is adopting a very interesting plan for increasing efficiency.

This paper has described in its issues of September 2, 1910 (page 391), and February 24, 1911 (page 349), the organization formed and the methods being used by the North Western to reduce accidents. A safety committee composed of officers and employees has been organized on each division, and there is a central safety committee for the entire system, composed of general officers, to which the division committees report. During the first six months of the campaign for safety waged by these committees the number of personal injuries was reduced 20 or 30 per cent. This is not credited entirely to their work, for traffic was not so heavy as during the same period of last year. But that the improvement was mainly due to the work of the safety committees is beyond question. The success of these efforts for increasing safety has suggested and brought about the formation of a similar organization and the adoption of similar methods for increasing efficiency. There is an efficiency committee composed of officers and employees on every division, 15 such committees having been formed already. The employee members are chosen from all branches of the operating, mechanical and maintenance of way departments, and it will be the object of the division committees to study and adopt means leading to greater efficiency in operation and maintenance, and particularly adapted to the needs of each division. There is also a central efficiency committee to which reports and recommendations will be made by the division committees, and which will work out and adopt policies for the entire system. The North Western has two grand divisions—that west of the Missouri river, and that east of it. The central efficiency committee will consist of the general manager or the assistant general manager and the general superintendent of each grand division, and of the following: Superintendent of motive power, superintendent of the car department, superintendent of transportation, engineer maintenance of way and superintendent of telegraph.

It is not the purpose to seek to apply the principles of so-called "scientific management." The object is to bring about *co-operation* between the employees and the officers that will increase the efficiency of (1) men, (2) materials, and (3) machinery. It is felt that as railway systems grow larger the avenues of communication between the rank and file and the general—and even the division—officers are being closed. The effect is to cause employees to lose sight of the very direct interest they have in the successful operation of the railway from which they receive their compensation, and to keep them from giving to their superiors the benefit of suggestions for improvements growing out of their own experience and observation. Probably no one fully appreciates the amount that railway managements might gain annually by drawing on the great reservoir of knowledge and ideas possessed by their thousands of employees.

The many shop kinks which have been published month after month in the shop section of the *Railway Age Gazette* show how innumerable are the labor-saving methods and devices which have been contrived by shop officers and employees. Many similar methods and devices have been contrived by subordinate officers in the track department. Who can estimate how many similar improvements could be suggested by the million and a half employees of American railways if opportunity and incentive to do so were afforded? The plan adopted by the North Western will give all employees opportunity to communicate suggestions for improvements to fellow employees belonging to the division committees, and will provide a channel for transmitting them to the division officers and the general officers. The results may be very interesting. However, even if the plan merely increases the zeal of the employees in their work and stimulates them to exercise more care and exertion it will in the long run be of much value to both employees and employers.

One would think from some things recently said about railway efficiency that it is entirely a matter of economy. This is far from true. The public demands, and has a right to require, good service. Efficiency, therefore, is operating only as economically as may be consistent with the rendering of good service. The management of the North Western clearly recognizes this, and has specially instructed officers and men that one of the main purposes of the campaign for efficiency is to improve the service to the public in every practicable way, as well as to increase the economy with which it is rendered. More civility in the treatment of patrons; more pains to keep stations clean and sanitary; greater attention to preventing the unnecessary smoking of engines; greater efforts to reduce loss and damage to freight; more strenuous endeavor to make passenger trains and fast freight trains conform to their schedules; these and other means to the improvement of the service are to be particularly insisted on.

The managements of the railways believed when they gave general advances in wages last year that they would be permitted to offset them with increases in rates. They were not allowed to do so. The increases in wages and the denial of increases in rates have been followed by a decline not merely in net, but, in many cases, in gross earnings. It seems clear that if the roads in general are to be able to make needed extensions and improvements and to continue to pay the present high wages they must increase the efficiency of their operations. Greater economy could be secured by reducing the quantity and quality of the service, but this might incense public sentiment and cause a renewal of recent attacks on the roads which would hurt both them and their employees more than the economies introduced would benefit them. The needed economies ought to be, and most of them must be, obtained by greater efficiency in the use of materials and in the working of the plants.

The efficiency engineers favor seeking to attain these ends by "scientific management," including the time study, the bonus system, etc. The leaders of the railway brotherhoods have expressed themselves as opposed to such methods. Many have contended that greater efficiency must be secured by the enforcement of sterner discipline. The power of the unions is so great, however, that attempts to enforce more rigorous discipline, like attempts to introduce so-called "efficiency methods," are apt to lead to serious struggles, and neither method best brings about that most desirable and necessary spirit of cordial co-operation so helpful in getting successful results.

There seems but one alternative to these methods. That is to bring about by some such means as the North Western has adopted, better co-operation between managements and men. The piece work and bonus systems speed up the employee by giving him the direct incentive of the prospect of larger individual earnings. They involve comparatively small increases in the pay of the less capable workman, and comparatively large increases in the pay of the more capable. The system of co-operation does not offer to the individual the stimulating prospect of an immediate increase in wages for every increase in *his* efficiency. But as the only source from which the wages of labor and return to capital can be derived is railway earnings; as the more efficiently the railway is operated the more there will be for capital and labor to divide; and as past experience has

shown that labor is quite capable of getting its share of increased earnings, it would seem it should be obvious to employees that every increase in efficiency which is secured by co-operative methods is bound to inure in greater or less degree to the advantage of employees in general. And, from the brotherhoods' standpoint, the co-operative method, which tends rather to maintain the high standard wage than to increase the incomes of individuals according to their special efforts and capabilities, should be the most attractive way to effect the desired increase of efficiency.

NEW BOOKS.

American Civil Engineers' Pocket Book. Mansfield Merriman, editor-in-chief. New York: John Wiley & Sons. Morocco, 1,388 pages, 944 figures and 495 tables, 4¼ in. x 7 in. Price, $5.

In getting out this pocket book the authors have kept in mind the object of selecting the topics to which engineers desire to refer, and then of so condensing the matter that the greatest amount might be put in the assigned space. The great advantage of such a book is that information on a wide variety of subjects may be secured from it more readily than from the standard text books or from treatises on the various topics. The subject matter has been divided into 13 sections, each in charge of a separate author who is an authority in his line, in this way securing a book much stronger and more complete than would be possible otherwise. All material was newly written and embodies the latest approved practice in the various lines, the more recent developments being treated especially full. The chapters on "Railroad Location," by Professor Charles B. Breed, and "Roads and Railroads," by Walter Loring Webb, give much data of especial interest and value to railway engineers, the latter chapter dealing especially with maintenance and operation.

The subjects of economics of location, truck standards and locomotive and equipment maintenance and operation, are all treated, while especially valuable data is given in the form of statistics of costs of operation, traffic density, earnings and valuation of American railways. The special features relating to electric railways are also carefully taken up. A valuable feature of the book is the cost data which is scattered through it.

Block Signal and Train Control Board, Interstate Commerce Commission; Third Annual Report. W. P. Borland, Secretary. Washington, 1911.

The Block Signal Board, M. E. Cooley, Azel Ames, B. B. Adams and F. G. Ewald, sent its third annual report to the commission November 22 last, and the principal parts of the report proper were reprinted in the *Railway Age Gazette* of January 20 and 27. The full report, a pamphlet of 250 pages, has just been issued. Besides the report itself, this thick pamphlet is made up of the following five appendices: A History of the Air Brake, by W. V. Turner and S. W. Dudley, 100 pages; The Car Wheel, by George L. Fowler, 38 pages; The Track Circuit, by J. P. Coleman, 17 pages; The Harrington Automatic Train Stop (report of tests by the board), 25 pages; and Reports of Inspection of Train Despatching, Signaling and Other Practices on Various Railways. There is also an account, similar to that which has been published in the *Railway Age Gazette,* of the automatic stop in use on the electric railway of the Washington Water Power Company.

The paper on the air brake is a very thorough and lucid sketch of the history of power brakes from the earliest days down to the latest developments in brake apparatus for high speeds and for variable loads.

The paper on the car wheel gives the history of the manufacture of cast iron wheels in this country and describes in much detail the practice in the wheel foundries of the Pennsylvania, the Chicago, Milwaukee & St. Paul, the Norfolk & Western and the Canadian Pacific.

Mr. Coleman's essay on the track circuit goes very thoroughly into the theory and practice of this vital feature of automatic block signaling.

Letters to the Editor.

SIGNAL ASPECTS—A REPLY TO MR. CLAUSEN.*

Philadelphia, April 8, 1911.

To the Editor of the Railway Age Gazette:

The minority has at last definitely set forth its proposition. "The indications, *Stop, Caution* and *Proceed,* given by the three positions of a one-arm signal, are entirely practical, sufficient and adequate to safely control the movement of trains at interlockings as they will elsewhere." Are they? Only two questions are involved. We all want simplicity; we all concede the simplicity of a one-arm signal, but (1), can we safely use it in connection with signals already installed? and (2), can we handle or facilitate traffic with it?

Records show that some railways in this country have operated for years safely and fairly expeditiously, under normal conditions, without any signals. It would be puerile to claim that they could not operate in the same way if, at established and well known locations, signals were substituted for flagmen; and that is exactly what Mr. Clausen proposes, without, however, supplying any substitute for the verbal information so frequently vouchsafed to the engineman by an intelligent flagman, leaving him with even less knowledge of conditions than was supplied by the traditional section man. "Why did you stop us?" "I don't know why, the boss told me to." "Where is he?" "Down below about half a mile, where the bridge is washed out." While this procedure might be permissible on a road having no other signals in service, it is questionable whether it would be advisable on one already well signaled with separate arms for diverging routes at interlockings. A practical demonstration would be the most satisfactory means of settling the question.

The second phase, however, is the important one, viz., could we handle or facilitate our present traffic by its use? To operate safely with such a system, giving only one caution indication, only one degree of caution would be permissible, and that is the degree requisite for safe operation under the most unfavorable conditions for which caution would be displayed. Any exercise of "common sense" or good judgment (?) on the part of the runner might lead to disastrous results.

In view of the change in operating methods in the twelve years since Mr. Rhea first promulgated the proposal the minority is now advocating, while granting for the sake of argument that the proposal was sound and adequate for our needs twelve years ago, some of us feel that it is not sufficient for present day requirements. To cite examples: First: Given a dense, slow, heavy freight traffic interspersed with a number of high class high speed passenger trains scheduled for a stretch of perhaps 15 miles at 75 to 80 miles per hour. A safe braking distance, allowing for all foreseen contingencies is, say, 1½ miles, but blocks of this length are too long for the operation of the freights, as it would certainly tie up traffic to require the slow freight to reduce speed to the rate required if it were to take a No. 10 crossover and move into an occupied yard at the signal 1½ miles from the point of obstruction; but if the first signal indicated "Pass next signal at medium speed," and the second signal indicated "Prepare to stop at next

*Mr. Rudd's opening paragraphs, which we must omit for lack of space, reply to certain points in Mr. Clausen's historical review. As to the charge that the recommendations of the signal practice committees were changed from year to year, he shows that the changes were in non-essentials; and he observes that the minority also modified its proposals a number of times. A clean cut proposition to employ a one-arm three-position signal for everything was not presented by the minority until Mr. Clausen read his paper at Montreal six weeks ago. And this proposition is not new; Mr. Rudd quotes from a paper by Frank Rhea, read at Boston in November, 1899, who proposed a one-arm one-light three-position signal for interlocking as well as for automatic block signaling. The discussion on Mr. Rhea's paper is found in the Railway Signal Association Digest, vol. 2, pages 33-43 inclusive. But during these 12 years since 1899 operating conditions have greatly changed and Mr. Rhea has progressed. The minority are resting their arguments on a theory that is out of date. Cross-overs are now made long enough to be traversed at 40 miles an hour; automatic signals are much more common and must be distinguished from interlocking signals; and permissive block working is recognized, so that more than one caution indication is necessary.

signal," the requisite information would be given and the blockade avoided. Second: Given a road in which permissive block is used for freights and absolute for passenger trains, either class of trains may accept, as per rule, the caution (distant) indication, but the passenger train cannot pass the caution (permissive) signal and enter an occupied block. Should the engineman be required to remember all the points at which the caution signal is located which he cannot accept, or is it preferable to designate it so that he can tell what it is by looking at it? Which practice lends itself better to the enforcement of discipline and which to the promotion of misunderstanding?

Further, with the minority scheme, if the interlocking plant is in permissive manual block territory, advance signals are compulsory, as otherwise the caution position may indicate either block occupied, on one or two tracks; a movement against traffic; into a yard; or to a branch, and while a passenger train would be permitted to accept it for the latter purposes, it could not accept it for the former. How would the engineer differentiate without stopping and examining the position of switches, etc.? Is this a good way to facilitate traffic?

Third: Given a four track railway handling all classes of traffic and the problem of weaving fast expresses in and out to pass local passenger and freight trains on the outside tracks and tonnage trains on the inside tracks, these expresses scheduled 77 miles in 89 minutes, with two or three slow-downs for water and one and sometimes two station stops. Place interlockings about five miles apart with No. 20 crossovers maintained for a speed of at least 50 miles an hour without danger or discomfort to passengers. Is it good signaling or good railroading to give no advance information to the engineer of the conditions at the interlocking, but to require him, when he comes in sight of a signal located perhaps a mile from the home signal, to immediately reduce speed, watch his track for obstruction ahead, misplaced switch, train in block or bad track, moving at this rate to the interlocking signal, passing it prepared to stop if he is diverted over against traffic or into a yard, and to crawl along at this rate for 2,000 ft. more until he reaches the advance signal, if there is one, and in its absence, so run clear through the next block? Or is it better to tell him definitely the condition of the interlocking signals and switches and let him run, especially when he may be crossed in and out three or four times on the 77 mile run?

If the minority standpoint is correct, why make a distinction between the main or high speed and the low speed, when you make no distinction between the medium speed route (good for 45 m. p. h.) and the low speed?

Is the providing of these long crossovers a waste of money? If it is bad practice to so signal that they may be taken at speed, why put them in? They certainly cost more than the shorter ones, No. 8 or No. 10. Or is it intended that the engineman shall "use his judgment," and having received the low speed signal, run then at medium speed, having decided that, because that is usually the route set up, it always will be right, and having good luck until some day he is sent into a yard by mistake?

This method of signaling, necessitating the use of "judgment," has been used in the past, with the result outlined above; and its popularity is on the wane.

Many conditions of similar nature might be cited did space permit.

If I made any unfair statements in my address, they were due to ignorance of the exact position of the minority. I judge none was serious, however, as none is pointed out. Mr. Clausen, with the advantage of a full exposition of both sides, has been eminently fair to us, and I can take exception to only one of his statements. He says that, because of the several proceed indications (proposed by the majority) it is necessary to use three stop aspects, etc., "These aspects are called:

1. Stop until authorized to proceed.
2. Stop and proceed.
3. Stop and investigate."

From our view-point the reverse is the case: these three stop indications are necessary in themselves and providing aspects for them increases the number of proceed and caution aspects.

The Standard Code, Rule No. 504, provides that, when a train on double track is stopped by an automatic block signal, it may "proceed at once with caution." It is not considered good practice to permit it to pass an interlocking signal in this manner. As some interlockings now cover as much as a mile between home signal limits or three miles between distant signals, it is considered a safer practice to indicate the difference between these two classes of signals at the signals themselves, rather than to mark them by a signal cabin half a mile away.

Further, in manual block territory, it has until now been considered desirable to differentiate between a block signal which a train may not pass without a card, and a switch set for siding, for instance, which it may pass without written authority. This distinction is especially desirable where high switch lights are located close to block signal lights. The manual block and interlocking signals come under the first class noted; automatic block signals under the second, and switch-stands, railway grade crossing signs, stop boards, etc., under the third. The tremendous mental effort necessary to remember these distinctions is about as burdensome as that required by a fair reader to recognize A, B and C. Further, there is no doubt that they all mean stop.

TEN FUNDAMENTALS.

There are ten principles or fundamentals which succinctly set forth the position of the minority, and a claim is made that the system proposed conform to these principles, and is in perfect harmony with the Standard Code. Let us examine them in the light of actual experience and in connection with the code:

1. "It is impracticable to provide a separate signal for each of the conditions on a road requiring cautious running and to maintain the fine haired distinctions necessary to their interpretation." The majority concedes this, or at least feels that it is inadvisable to attempt it. We claim, however, that the various causes may be so grouped, that we may, by a few simple aspects, give definite information as to the position of the next signal, condition of the track ahead, etc., so that the engineman, required to exercise good judgment and common sense, may have something tangible on which to base the decision governing his action. This being far preferable, in our judgment, to telling him in the majority of cases to reduce to low speed, when he knows perfectly well that actual conditions do not require or warrant such reduction. Human nature is a good deal the same all the world over and a rule is more easily enforced when the occasion for its observance is obvious.

2. "It is unnecessary, *and in fact dangerous* to tell the engineman by fixed signal how he shall control his train at some point in advance." This statement is correct, barring the italics, provided each signal is so located that it may be seen far enough for the fastest train to stop in the space between it and the first point of view, and requires action not at the signal, but *approaching it.* Such locations are impossible if heavy curvature and natural or artificial obstructions perforce reduce this view distance to a few hundred feet. To carry out the minority theory, either trains must, under such conditions, reduce speed approaching such signals, or the signals themselves must be located at some distance from the danger point. This would mean overlaps on automatic signals, and interlocking signals two or three thousand feet from the crossovers and switches they protect, and no discipline could fairly be imposed if they were overrun.

The majority theory is that, unless operating conditions are such that low speeds only are required, approach information should be furnished, so that speed may be maintained.

The minority would require low speed approaching each caution signal. The majority would require low speed only when it is necessary, and holds broadly that the distant signal as used in common practice today is the key to the situation, and is in

effect the *Stop* signal; the home signal is a marker to show the danger point. Or, stated in another way, we provide a distant signal at proper distance from the danger point. In the caution position it says; "you must stop (not here, for you are running so fast that it is impossible, but) at a certain point beyond, marked by another signal. Of course, if you find that signal at caution or proceed you may pass it, but, in any event, you must so control your train that you can stop if necessary. If that point is a mile away and you have a train with high braking efficiency, and you are running at medium speed, it is not necessary for you to slow down to 6 or 8 miles an hour here, but you must stop at the danger point. If you are running at high speed, you must slow down at once and you must know your road sufficiently to be familiar with the approximate distance you have to run." Which is the safer? Which lends itself better to the enforcement of rules? Which facilitates traffic and cuts out unnecessary stops? Which reduces the use of the emergency application, and finally which credits the engineman with more intelligence?

3. "Advance information so given is misleading and unreliable, as it is subject to change without notice and, therefore, the engineman cannot safely use it. If he does so use it, it is done at the expense of safety." Is it safer to give the stop indication without any preliminary warning, so that the runner is unable to stop before passing it, or is it safer to give preliminary warning a sufficient distance away, so that he may know what to expect at each signal?

Granting that, in the absence of approach locking, routes are sometimes changed after a train has passed the distant signal and that false clear failures sometimes occur, is one practice safer than the other under such conditions? Would men, operating under the minority scheme, reduce speed immediately on seeing a clear interlocked signal, so that, if it were changed to stop, they could stop before passing it, or on receiving the proceed signal at an automatic (not indicating block clear, but that there was no caution signal displayed) immediately reduce speed so as not to overrun the next signal? Would they reduce speed at each clear signal for fear the next might be at stop?

It seems to me that the rules governing the proceed indication, as outlined by Mr. Clausen, would bear a close resemblance to the instructions reported to have been issued by a superintendent on a road having a ferry connection, in the good old times when signals were a novelty. His two verbal orders are reported to have been as follows:

"Don't you fellows race the Pennsy trains, but don't let them beat you," and, "I want you to stop at these new signals, but *don't miss your boat!*"

Great stress is laid on the claim that the proposed scheme is in "harmony with the Standard Code," and yet the Standard Code especially provides for giving this "dangerous" and "misleading" advance information. Under Rule No. 501 appears the name—Caution Signal; occasion for use—block is clear, second block in advance is not clear. Indication for enginemen and trainmen—approach next home signal prepared to stop.

4. "The conditions of modern railway operation do not require trains to run at full speed past caution signals; time gained by this practice is gained at the expense of safety." What is full speed? What is a caution signal? If the distance between a distant (caution) signal and its home is full normal braking distance of the highest speed trains, modern conditions require that such trains must reduce speed *in passing the signal,* but do not require such reduction for trains of slower speed and higher braking power. Is it more dangerous to say "prepare to stop at the home signal," as the Standard Code says, or to say nothing in regard to the next signal?

5. "Each signal should indicate stop, caution or proceed, and have no relation to signals in advance or in the rear." This statement, fundamental in its nature is one of the severest strictures ever passed upon the Standard Code, and stamps our present railway practice as basically wrong. It is almost incredible that any intelligent operating officer has the temerity to preach it in this year of our Lord, one thousand nine hundred and eleven.

The Standard Code of the American Railway Association, authorized edition, February, 1911, page 326, says:

DISTANT BLOCK SIGNALS.

Indication for Enginemen and Trainmen.	Occasion for Use.
Proceed with caution to the home or advance signal.....	Home or advance signal at stop.
Proceed	Home (and advance) signal at *Proceed.*

The minority, if it had its way, would wipe the distant signal off the map and give no approach information of the condition of the block signal.

The majority has held and still holds that the code is incomplete and that it should provide indications covering divergence from main tracks at interlockings, differentiating between those over long crossovers and over short crossovers and between a caution signal indicating block clear and one indicating block occupied; but it also claims that the code, as far as it goes, is founded upon absolutely correct basic principles, and that the American Railway Association has legislated conservatively and safely rather than recklessly and ignorantly.

6. "That each signal should be observed in turn as the train comes to it, and not at some point in advance at the option of the engineer." The majority endorses this proposition, but differs with the minority on the interpretation of the word "observe." The minority interpretation of "observe" carries with it immediate action, in fact action in many cases before the train comes to it. The majority interpretation is that, if the signal is observed—that is, if its indication is properly conveyed to the engineman's mind, the action may be immediate or it may be deferred, depending upon the running conditions.

If all caution signals are to be alike, it is necessary to reduce speed, not on passing them, but *approaching* them, for there may be a short crossover just ahead leading into a crowded yard; there may be a train a few hundred feet ahead (if permissive blocking is in force) or there may be bad track ahead. If, on the other hand, distinctive signals are provided for:

(a) Diverge at low speed,
(b) Prepare to stop at next signal,
(c) Block occupied,

the action required is different. With the majority scheme, a train would receive first *b* and reduce speed so as to stop at the home signal, and then *a,* and proceed at low speed. On the other hand, having received the proper distant indication for *c,* and given a view of the track for a mile ahead, such reduction is unnecessary, and the train may run prepared to stop within the visible stretch of track, slowing down approaching curves and really running on sight. Assuming, however (if all caution signals have the same aspect) that the engineman takes the signal to mean block occupied some distance ahead, when, as a matter of fact, it means cross over, the results would be serious. Therefore, the use of all caution signals interchangeably, requires always a very slow movement and decreases the capacity of the road. If the function of signals is to impede traffic, the minority has the scheme par-excellence to accomplish it. If it is to facilitate as well as safeguard traffic, it is a dismal failure.

7. "That, with signals properly located, it is time a train should be run with caution if it has reached a point so close to trains or stop signals in advance that a caution signal is received." This, I judge, also applies with signals improperly located. This proposition appears, however, to be out of place, as with the minority scheme no caution signal would be received, for proposition No. 5 says: "Each signal . . . should have no relation to signals in advance or in the rear." Can it be possible that there still lingers in the author's mind a feeling that perhaps (although No. 5 is necessary to make the scheme workable) it is a good thing to have the signal in the rear bear some relation to the signal in advance, but that the fact should be kept a secret from the operating officers and the engineman?

Can the intelligence and common sense of the engineman be trusted to determine the meaning of each caution signal and to know why he is stopped at each stop signal, while at the same time he cannot be trusted to use judgment under the indication "prepare to stop at next signal," and must be required to

run at five or six miles an hour for a mile for fear he will pass that signal? This may not be the feeling, but it is a reasonable explanation of clause 8.

9. "That no proceed or caution indication should imply or assure clear track to a point in advance. That railway signaling devices and our methods of communication have not reached the perfection that will admit of this being done. We cannot know positively if the track is clear, and further it may not stay clear. We are under a moral obligation not to give such misleading information." Nothing could more plainly discredit the Standard Code than this proposition. Page No. 327 of the revised Code, previously referred to, shows, Rule 301:

HOME BLOCK SIGNALS.

Name of Signal as Used in Rules.	Indication for Engine-men and Trainmen.	Occasion for Use.
Clear Signal	Proceed	*Block is Clear*

According to the first sentence of this proposition there should be no "occasion for use" of such a signal. The proceed signal should, therefore, in the interest of simplicity, be eliminated. And, certainly, in the light of the other propositions, it should be eliminated for safe operation under the minority scheme, and the indications should be reduced to stop and caution. Then what becomes of our block system? Are we ready to give it up? The statement that signal devices are so unreliable that they cannot properly indicate clear block requires proof; a bald assertion will not suffice. The statement is not justified by the experience of most of us.

It is true that accidents occur on the most fully protected roads, and they always will. None of us is perfect, and none of our works will ever be perfect, but actual experience has shown that, on single track, by the use of complete manual controlled block with outlying switches electrically locked, with approach locking at interlockings, and the additional safeguards at our disposal, the integrity of a block may be secured and preserved, and that, therefore, the engineman may properly be assured of it; and further, that the same safety may be assured on double track, four track, etc. What moral right has the public or any management to ask an engineman to proceed at the high speeds now prevalent without such reasonable assurance? This does not imply that he is to shut his eyes as soon as he passes a signal, and open them only on approaching the next; nor does it imply that he is to relax his vigilance in watching for the results of sudden storms or obstructions, such as landslides, etc., and as a matter of fact it does not so result in general practice.

10. "That it is difficult, if not impossible, to maintain discipline and proper observance of the great variety of caution indications proposed by the majority, because of the fine distinctions involved." What are these caution indications? They are the ordinary distant signal for the main track; a signal for divergence at limited speed (to be used when desired for passage over long crossovers), combined with a distant for the next signal; a distant signal for the medium speed route; a signal for diverging at low speed, combined with a distant for the next signal; a slow sign, and a distinctive mark to indicate "permissive block" or proceed, track occupied. The fact that all these indications, and all the aspects, except the permissive, are being successfully used, not only as a separate system but introduced in connection with the old methods, on some of the greatest trunk lines in the country, as well as on a number of thin lines; with magnificent results, and with the approval of the men most concerned in their use, the enginemen, is sufficient refutation of proposition No. 10.

A system conveying no indications other than stop, caution and clear must of necessity be predicted on the principles enunciated by the minority, and the proceed indication serves no purpose except to announce that the caution or stop indication, which might be expected, is not displayed—"absence of restricting signal," as the majority terms it. This indication would be the same in all fixed signals—"slow-boards, stop-boards, yard limits, switch, train order, block, interlocking, semaphore, disk, ball or other means for indicating stop, caution or proceed," and continuous advance or block information would be impossible. While our enginemen can intelligently grasp but three aspects, they can guess at the meaning of all these enumerated. They must do this, or else must remember the information each is to convey by associating it with some land-mark near at hand.

The time has passed in this country when the block system, as outlined in the Standard Code, can be abandoned for the cow-path principles of running on sight, with stationary mechanical herders, giving two indications—stop and caution—covering conditions only at these particular locations "and not at some point in advance." Progressive managements will not advocate such a scheme, public sentiment would not tolerate it, and the government would not permit it.

As W. H. Elliott aptly puts it, "Signal indications should not be 'simplified' to a point where definite information is not given to the engineman. It is a good thing to have a simple signal system, but it should not be made so simple that to insure safety of operation an engineman will have to reduce speed to a point where trains are run so slowly that full advantage cannot be taken of the track facilities provided. The economy proposed by Mr. Clausen in simplifying the signal system is at the expense of efficiency and capacity."

MR. CLAUSEN'S THREE LETTERS.

Finally, Mr. Clausen, to bolster up his position, quotes three letters, which somewhat becloud the issue.

The first letter begins: "The very elaborate signaling recommended by some is founded upon the idea that engine-runners, on account of their mental incapacity, must be instructed, by the language of signals, the precise manner in which their trains shall be handled under every circumstance, etc.," and claims that this premise is unsupported by facts, and that their enginemen are intelligent and reliable.

The portion in quotation marks might be criticised were it not begotten in ignorance. Instead of publishing this letter, Mr. Clausen should have advised its author that the majority has always held that the enginemen have at least ordinary intelligence and that, as a class, they are far above the average, and that it is the minority who has always claimed that they were incapable of instantaneous reading of the various "complicated aspects" involved. It is the minority that is belittling their mental equipment, by saying slow down because you haven't brains or skill enough to stop a mile away unless you do so—nor intelligence enough to carry in your heads 15 or 20 aspects, though we grant you have learned the characters of the alphabet.

The second letter is a complaint of the increased cost of complicated interlockings and two-thirds of it is a plea for the abolishing of derails. Of course, the cost of derails has a bearing on the cost of the interlocking plant. It has no more bearing on the question of signal indications and aspects than the frieze of the Parthenon on the price of butter in Oshkosh. It may add to the gayety of nations, but is not a cogent argument for a one-arm signal. The actual difference in the installation of a plant would be the difference in cost of the high signals only, and those who know anything about signaling can easily figure out at any given plant what the percentage difference would be.

The third letter is a plea for simplicity and (probably unintentionally) a very strong argument for the majority claims. It says "When a man is running a train at a speed of 60 miles an hour, perhaps on a down grade, a 'stop' signal may mean a very different thing to him from what it means to a man going perhaps 10 miles an hour on a level or an up grade pulling a heavy train. In other words, the signal may *say* the same thing in both cases, but what it will mean in practice to the man who receives it is a very different thing. Then why confuse the situation by all sorts of absurd requirements?"

The majority says, tell the man the truth, simply and plainly; and if the same signal means different things, tell him which it means. Why risk misleading him when you can guide him right?

A paragraph is devoted to the instance of a distant signal being habitually left at caution with the home at clear, and it is asked whether it had not better be removed entirely. We reply, yes; but, still better, it should be made to give accurate information and not be left to indicate stop at next signal when the medium speed route is made and next signal may be passed at 45 miles an hour.

Finally, we agree with the writer that every device must be made as nearly foolproof and as simple as possible, and that, if signaling by any means leads to the abolition of grade crossings, it is a blessing, even if in disguise.

It is generally conceded that the signaling fraternity is as conscientious and as hard-working as any in the railroad world. Whether its members are broad gage or narrow gage is perhaps debatable. They are on trial. It is to be hoped that they may prove equal to the task of harmonizing their differences and recommend, without division, a comprehensive system which, while meeting the most exacting and complicated conditions of the trunk lines, will at the same time supply the simple needs of the smallest and weakest roads safely and economically, and which consequently will be worthy of adoption by all the roads of the country. If they can do this, their recognition as among the most important operating officers, a recognition long striven for and so far generally denied, is bound to come through the logic of events and the value of their work. A. H. RUDD.

A DEFENSE OF THE COMMITTEE WORK OF THE ENGINEERING ASSOCIATION.

EL PASO, TEX., April 3, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The editorials in your issues of March 23, page 628, and March 24, page 725, about the manual of the American Railway Engineering Association reflect on the work of some of the committees of that association. With due respect to the leaders of the association, I wish to say a word from the committeeman's standpoint.

Criticism of committee work should be fundamental and complete. It should not be offhand, hypercritical, superficial and inconsistent as it sometimes is even when coming from men whose expression carries weight quite apart from the quality of the criticism. This frequently results in impromptu action by the association whereby well considered and valuable work of a committee is impaired. Revisions of the manual became necessary from that cause. The association needs protection against its leaders quite as much as against its committees.

During the last convention, a leader on the floor opposed the specifications for water tanks because he alleged them to be too definite and exclusive. But in the detailed discussion he insisted on one method only for threading the tank hoops, whereas the committee admitted two standard and approved threaded ends. By an unsupported and questionable declaration that upset rods would cost the more, the association was led into hasty and ill-advised action limiting it to one thing when another equally good or better is available.

This is typical of the inconsistency and superficiality of much of the criticism which comes from the floor and, owing to the prestige of the critic, is accepted to the detriment of well considered committee work. The admirable specifications for frogs and switches received much of the same kind of mutilation. Your own criticism of the form of roof for wood water tanks preferred by the committee is equally vulnerable. A thorough analysis shows that form to be the simplest and most economical. Responsibility for imperfections in the manual by no means rests exclusively with the committees.

If a committee cannot reach sound conclusions on one subject in one year, it is hopeless to expect that the suggested general revision committee could pass conclusive judgment on the entire annual work of the association.

Committee work should be considered in the light of the instructions governing it. Sometimes the association reverses itself. In 1910 the work of the water service committee was rejected on the ground that it was too general in character. In 1911 it was rejected because it was considered too specific. In each case the committee worked under explicit instructions. Such a policy is not favorable to a continuation of the conscientious care which has marked committee work.

The exceptional value of this association is due primarily to the comprehensive and democratic character of its membership and to the fact that its work is done by the rank and file of the men who build and maintain the way structures of the railways. It is up to the association to find out what it wants its committees to do.

I believe the anxiety about the manual is largely without foundation in fact. I believe our only concern in connection therewith should be to see that it represents good, sound practice only. J. L. CAMPBELL.

Engineer Maintenance of Way, El Paso & Southwestern.

SOME GROUNDS FOR ENCOURAGEMENT IN THE RAILWAY SITUATION.*

BY FAIRFAX HARRISON,

President, Chicago, Indianapolis & Louisville.

It is with some hesitation that I venture to avow that there are cheerful views on the railway situation to-day, because there are so many difficulties surrounding the management of railway property as almost to justify a railway officer in becoming a confirmed pessimist. But leaving for the moment to others the rehearsal of the difficulties, it may be well to look for portents of good omen. Fortunately, the railway horizon is not altogether black. Even in the decision of the great rate case, which brought bitter disappointment to many railway managers who, with confidence, had expected from it some measure of relief from their immediate responsibility—even in that disappointment there are grounds for encouragement.

In one vital respect that great controversy has accomplished something for the railways which has never before been possible. The very importance of the questions involved and the theory on which the case was presented required the Interstate Commerce Commission to make a thorough examination of the financial condition of all the railways of the United States. The result was impressive. With opportunity such as no one ever has had before, not even the great banking houses, and after months of careful and serious investigation, the accredited experts of the government in railway matters—the Interstate Commerce Commission—came to the conclusion and certified to the world that under existing conditions the American railways are financially sound. Think what this means to the doubtful investor. No industry seeking capital, with the single exception of the national banks, has ever had such a certificate. One could now almost endorse on a new issue of bonds, "Security approved by the United States."

Furthermore, because responsible and harried officers of the railways, doubtful of the solution of their immediate and pressing problem of prolonging successful management, had testified that the railways should have additional revenue if they are to grow and prosper, the Interstate Commerce Commission added the assurance that, if the time shall come when such a view shall be demonstrated to be immediately apparent, they (the commission) will exercise the power which the law vests in them and permit such advances of rates as may be necessary to maintain the sound financial condition which they certify now exists. Let us consider for a moment what is the import of this declaration and solemn covenant. Every successful railway in the country must continue to grow. A railway which is not a progressive railway is a dead railway. The American people

*From an address before the Transportation Club of Indianapolis, March 31, 1911.

have been wont to look to the railways to lead in promoting and encouraging new industry, for there is no industry in which they are not partners. As the volume of the business grows the railways must expand and in our Jack's bean-stalk civilization such expansion will always be too rapid to admit of providing the necessary money out of the accumulated railway income, be it never so conservatively administered. The railways must, therefore, be forever calling for new capital, and that they can now do and point to a definite assurance that the national government will foster and protect the capital so invested. It was almost worth the disappointment over the adverse decision in the rate case to realize this.

The railways of the United States are not ruined by the rate decision, but it has in truth called on them for a tremendous new effort.

The most important ground for encouragement to-day is the fresh stimulus which has been given to the study and practice of efficiency in railway operation, for we still hope to overcome our difficulties by self-help rather than through enfeebling dependence upon a government guaranty.

I do not now refer to or advocate the theory or the application to the railways of the so-called "scientific management" which has lately been bruited over the land. Whatever may be accomplished by such means in individual industrial functions, we may safely assume that "scientific management," as the term is currently used, will never be practiced in the broad and complicated problem of railway operation. The representatives of organized labor at the recent hearings before the Interstate Commerce Commission spoke the final word of impossibility to any such expectation when they said that American labor would never submit to the mechanical limitations of those methods.

Nevertheless, there is an increased efficiency of method which can be practiced and which will go far to accomplish the salvation of the American railways which are to-day operating on a narrow, and hitherto ever narrowing, margin between the lowest rates in the world and the highest wages in the world.

It may be admitted that many of the methods of current railway operation are wasteful, but the railways do not stand alone convicted of this serious indictment. As a people we are the most wasteful civilization has ever seen. It is an evidence of our youth. We use our natural resources as a child plays with his Christmas toys, with hectic attention now to this, now to that, and so little care or forethought that at the end of Christmas Day many of the gew-gaws are broken and destroyed. It has been so with our forests. The state of Indiana, once almost entirely forest, stands, scarcely a century since the first considerable immigration, practically denuded of native lumber supply, so that her railways are buying their crossties in northern Michigan and in Mississippi. We still see rotting fences of walnut rails to testify to the exuberance of the original timber and the waste of the pioneers.

What has become of the reservoir of natural gas which so short a time ago was one of the glories of Indiana? It would be merely painful to ask if it has been efficiently conserved and distributed.

Waste is the characteristic, also, of our agriculture. Rejoicing in a soil than which there is no richer in the world—the deep, black humus filled area of the corn belt—many Indiana farmers go on robbing the land of its fertility with crop after crop, and little thought for the future. They have always believed that if the incredible should become the actual and their land should no longer yield, they could pull up and go west, as their fathers came to Indiana, to a promised land, where virgin soil forever awaits the plough. Even to-day, when the census tells us how many farmers have so emigrated, and there appear to be limits even to the hospitality of the West, we see too few Indiana farmers conserving what they have by keeping cattle and feeding on their land at least a part of the abundant corn crop; and at this season of the year we even see the farmer burning in the field the fodder which might have carried some young cattle over the winter.

We are wasteful, too, in our personal habits of extravagance. Senator McCumber, of North Dakota, put this very well and forcibly in congress the other day when he rehearsed what the farmer, so frugal at home, spends for a day in New York. Here is his list of expenses measured by farm produce:

Cab to hotel	6 bushels of oats.
Tip to driver	15 cabbages.
Tip to elevator boy	2 dozen eggs.
Tip to bell boy	1½ bushels of barley.
Breakfast	½ ton of hay.
Tip to waiter	2 bushels potatoes.
Luncheon	1 sheep.
Tip to waiter	1½ bushels of carrots.
Dinner	4 bushels of rye.
Tip to waiter	1 bushel of onions.
Room	Half a car of turnips.

So in confessing that American railway practice has been wasteful the railway man simply takes his place beside his fellow citizens in other walks of life. But there is an economic pressure on him which no other class of the community has yet felt, and this has been teaching us since the panic of 1907 that we must learn to practice efficient economy in railway operation. Mr. Brandeis has undoubtedly quickened this study by quoting so publicly and so dramatically as to arrest the attention of the nation, the extravagant claim of one of the efficiency engineers that the railways might save a million dollars a day by adopting his particular panacea. While little serious consideration has been given to this claim, it is a fact that since Mr. Brandeis sounded his clarion, many responsible railway managers, who had some difficulty in restraining their immediate indignation at the impertinence of the assertion, have been looking about with renewed energy to see where they can institute greater efficiency of operation. Men who have reached the top because they have been more efficient than their fellows are now taking up their belts another hole and asking questions which have set many a subordinate forward to a realization that he is spending money unnecessarily to accomplish his particular stint of work.

If the operating offices are studying more closely their unit costs to-day, it may not be considered inopportune to question whether the traffic officers may not with profit study the efficiency of their methods also. One can fairly ask whether rate making as practiced to-day is as efficient or as systematic as it might be. It has been well said, in explanation of the apparent lack of system, that railway rate making is not a science, but, like any other price making, is an art. But this statement will not justify beyond criticism our present methods of making rates. Artists are notoriously given to vagaries, and, yielding to no one in admiration for what is perhaps the best equipped set of men in the railway service—the traffic managers—it must be admitted that there has not been much technique in their practice of the art of rate making in the past. They have seldom based their rates on principle; they have sought chiefly to secure tonnage and move it, and they have, out of very human necessity and temptation, made many compromises under the exigencies of competition, which have resulted in the present low basis of rates. Every shipper knows that he has secured the reduction of more rates from the traffic manager than from the railway commissioner. It is doubtful whether any current rate between competitive points can be analyzed to principles; usually it is the result of transportation and commercial history, and as little represents the "value of the service" as it does the theory of "what the traffic will bear."

But hereafter under government regulation the rate maker must base his work upon principle, and while probably he can never, under our American conditions, create a strict science of rate making, he can promote the art into a profession. A profession is the practice of individual initiative under established rules; the lawyer shapes and weaves the settled rules of the law to meet new facts and conditions under the regulation of the courts. The surgeon adjusts his every operation to the sudden emergency, but always within the limitation of the binding etiquette of his profession. Both lawyer and doctor draw on

science, the recorded theory of the philosopher, and both use art in the particular application, but always they can cite a principle for everything they do; and it is in this that a profession differs from an art. The great painter is little bound by rules and philosophy; the musician even less; their individual genius flowers differently in every generation. The nightingale cannot tell why he gushes melody.

It is possible that the rate maker in the past has modeled himself more on the nightingale than on the lawyer and the doctor, but it is a cheering promise for the future of American railway practice that the necessity of constantly justifying his rates upon the witness stand is forcing the traffic office to study, for example, the cost of service as an element of the basis for a rate.

It is fair to say that the traffic officer has had peculiar handicaps not of his own making. One of the greatest difficulties he has met in adjusting himself to regulation has been the unfortunate ease with which the lawyers have defended what is sometimes bungling rate making by the terrible plea of confiscation. When, in the case of Smyth v. Ames, the Supreme Court of the United States laid down the principle that there is a minimum below which regulation may not reduce railway revenue, and restrained, on the ground that they were confiscatory, the maximum rates which the state of Nebraska had sought to impose on the railways, a swarm of injunctions was let loose, like locusts upon the land. Every time governmental authority regulated a rate or a system of rates, the railway officers, under the advice of counsel, pulled long faces and pleaded poverty. While in some cases of a general attack upon a whole system of rates it was a sound plea and well taken, in other cases, involving a single rate alone, it was Pickwickian.

As a result of the analysis by the Interstate Commerce Commission of the financial condition of the railways as a whole, confiscation, as a working hypothesis in practical rate making, is likely to be relegated to the limbo of history, to be there reserved for invocation in those rare cases where sudden popular fury seeks to overthrow all constitutional limitation and the very bulwark of property.

The study of systematic rate making has been confused also by the will-o'-the-wisp of the physical valuation theory. At first it was the popular advocate, the shrewd politician, who seized upon physical valuation as a slogan because he had heard so much of watered securities that he believed that a valuation of railway property would afford an automatic excuse for compelling a reduction of rates. But after the first few valuations had been made the shrewd politician dropped that theory like a hot potato. The practice of the railways in the past of putting back into the property so large a proportion of their revenues through maintenance expenses, and the increment of real estate values which the railways claimed equally with the owner of the corner lot, were demonstrated to have run up the physical value of most of the railways, when ascertained by any fair system of appraisal, to a figure which was dangerous to the theory that rates were too high if based solely on physical value. So some railways themselves who at first had opposed physical valuation, seized upon the discard of the politician and promoted it into a ground for an injunction. But probably this plea must now be abandoned also by the railways. The implacable logic of the suggestion that on this theory as values are constantly increasing, rates must also constantly increase, would seem to put an end to rate making on the simple arithmetic of physical valuation, for every student of political economy knows that railway rates in the United States, taken by and large, have, through the operation of general economic laws, gradually and steadily decreased.

I believe that most traffic officers will be glad to be put to the necessity of justifying their rates by the more difficult appeal to the merits of their handiwork, and so to become practitioners of what will be recognized as a learned profession.

It is a cheerful sign of the times also to observe new evidences of increasing efficiency in the practice of the government function of regulation. A jury empanelled from the general body of citizens is doubtless as well qualified to judge the merits of facts in controversy as any human agency; they represent what the poet terms the common sense of most. But when it comes to passing upon the merits of the technical activities of highly organized and sensitive functions like those involved in the operation of a railway, it is not too much to ask that at least a special panel should be drawn for the jury in such cases. Whatever may have been the case in the past, when regulation was in its infancy, to-day the government officers who administer the powers of regulation which the state has assumed to exercise, are becoming daily better qualified and more expert in their duties, and as they appreciate the problems of the railway officer and learn from personal contact that, like themselves, he is usually a very human man trying to do his duty to those who employ him, and very little of an octopus, they have grown tolerant and, while alert to perform the full measure of their public duty, are increasingly willing to be fair, even when there are strong evidences of momentary popularity to be derived from doing the thing which is unfair.

While discussing regulation, I venture to suggest to some of you who are engaged in other industry than railroading, that regulation is not likely to be forever limited to railways. The railways have perhaps been through the worst of their experience, and are now almost ready to take their place in the safe and strictly supervised rank of the national banks. In the next few years they will probably be able to view with sympathy the similar subjugation of other branches of industry. The recent decision of the Supreme Court upholding the corporation income tax law has firmly driven in the entering wedge of effective and implacable governmental control of all corporate forms of activity.

The system of the social democratic state which regulation of industry involves may thus be enabled to fasten upon all our commercial life. It will perhaps next manifest itself in respect of our manufacturers, and it will not be confined to the trusts. The small railway has been included with the great system and is regulated equally with them; so the logic of regulation will involve the small manufacturer with the great. Perhaps not even the press will escape regulation. Ferdinand Lasalle, who in the middle of the nineteeth century was preaching in Germany advanced social doctrine, much of which has now matured into political commonplace, included the press in his programme of state regulation of business activities. He maintained that the press could be debauched only by the tendency to become not a pulpit of light and learning, but a commercial venture, deriving its principal revenue and even some inspiration from paid advertisements, and to preserve the freedom of the press he proposed that by law the publication of advertisements should be limited to a government gazette. Recent events in the post office department at Washington imply that this is not impossible, even in the United States. We can then imagine the rural free delivery carrier of the future leaving daily at every vine-clad cottage a pound of *Congressional Record* encompassed and illustrated by five pounds of advertisement, while the contemporary muckraking magazine will be clad in the consciousness of the rectitude of its intentions and will bear on the modest cover of its slender proportions the image of a fig leaf.

The day of the Manchester school and *laissez faire* is gone. The day of the social democratic state is dawning. Personally, I do not repine at the change, although I have been educated in the school which thrilled with the achievements of unregulated capital. I do not mean to laud the mere sudden acquisition of great and vulgar wealth by individuals, but, regarding that as an incident to the national increment of strength and power through the development of the national domain, the period through which we have lived and which is now drawing to a close has witnessed superb daring and skill and courage on the part of our captains of industry. It is they who have made our vast country blossom where it was wilderness. It is they who have accomplished for the United States what every nation in the world

seeks ardently as an assurance of existence—a steady increase of population—by providing through their activities the compelling allure for immigrant labor. In fine, they must be chiefly credited with those industrial triumphs which brought our country in the brief period between the civil war and the Spanish war to a commercial position which has challenged the political and military respect of the entire civilized world. Perhaps we grew too fast, but we grew nevertheless, and that growth was due in no small measure to the methods of the men who dared and in daring did, as most adventurers do, things which a subsequent and more intense civilization cannot approve.

The railways of the United States are part of the achievement of these men and they have suffered a terrific economic upheaval to pay for their sins. Though the consequent struggle for the continued existence of the regime of private ownership and initiative is not yet finished, I venture to believe that the railways may still work out their salvation, but only if they will bend their energies more to increasing the efficiency of their methods—to intensive cultivation of their opportunities—than to resistance of decrees which organized society has determined to enforce upon them.

Facing, then, the inevitable and changing front, as the world did after the battle of Waterloo, it is the duty of railway officers of every rank to-day to adjust themselves to the new conditions and accomplish in their profession a new achievement of which hereafter the American people can be as proud as they now are of the marvel of the construction of the railways in the generation which is dead.

It is no time to lament the past or recriminate the inevitable. If it is a time of adversity it is the more a time for courage and cheerfulness, like that of Paul Jones on the *Bonhomme Richard*, when his ship riddled and his masts shot away, his flag at last fell to the bloody deck. "Have you struck?" called the English captain, and Paul Jones replied with a voice of thunder: "Sir, I have just begun to fight!"

Every schoolboy knows what was the result, and every schoolboy will know what the American railways can do in similar plight.

THE BURLINGTON'S ENTRANCE INTO THE SOUTHERN ILLINOIS COAL FIELDS.

The officers of the Chicago, Burlington & Quincy began, about nine years ago, investigating the possibility of entering the southern Illinois coal fields and building up a large coal traffic from the mines northward to St. Paul and the northwest, where the winters are severe and the demand for fuel great. At that time most of the fuel supply for this territory was brought from the Pennsylvania and other eastern fields by water to Duluth, and the competition from this source would have to be met by the Illinois coal. Also, as the eastern coal was of a somewhat better quality than the Illinois coal, the latter would not command the same price in the common market. Therefore to develop a northbound movement it would be necessary to fix a freight rate which would enable the Illinois operator to sell his coal for less than that from the east.

After study of the cost of production at the mines, it was found that the highest rate possible to St. Paul was $2.10 per ton, or 3.2 mills per ton mile, the distance from Herrin, Ill., to St. Paul being 648 miles. Such a rate could be made possible only by operating full trains on a low grade line, especially as the return movement would consist of empty cars.

At that time the Burlington had a line from St. Louis north through Beardstown, Ill., Galesburg and Savanna to St. Paul. That part of the line north of Savanna had originally been built to a 0.3 per cent. grade, but south of Savanna it had been built, in common with most roads in this part of the country, on a 1 per cent. grade. The point on the line nearest the coal fields then was St. Louis, about 85 miles distant. The question was whether the road could reduce grades and extend into the coal fields at a cost that would make it practicable to haul the coal at

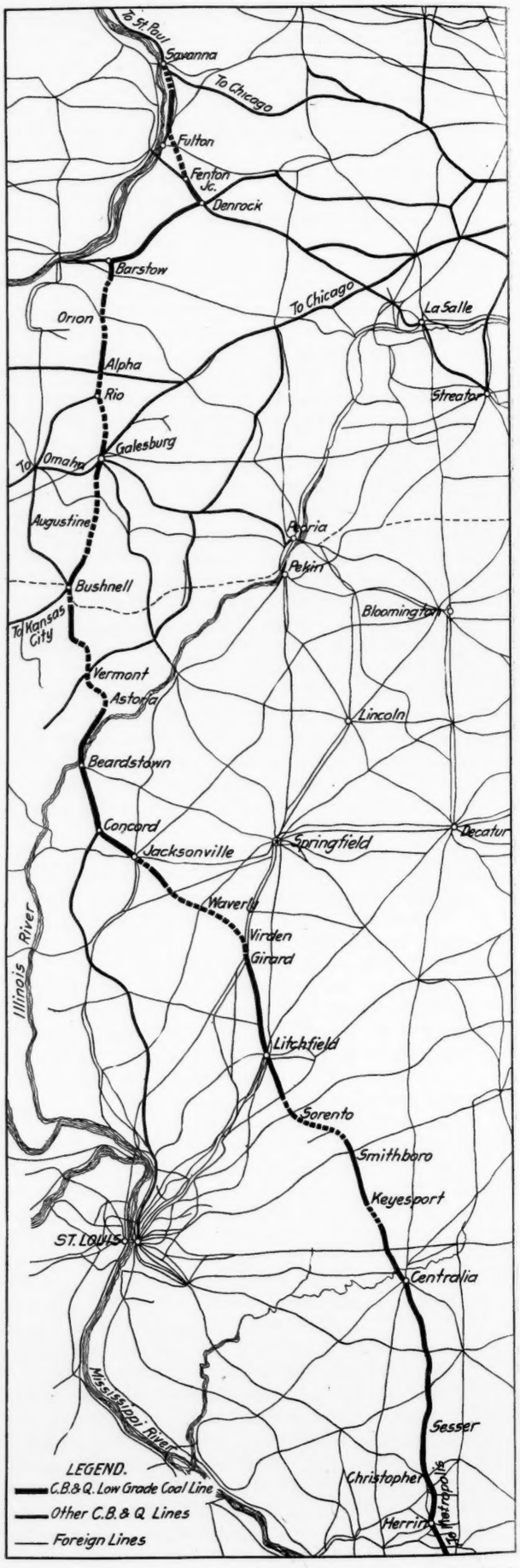


Fig. 1—Burlington Extension into Southern Illinois Coal Fields.

the necessarily low rate. Careful surveys and estimates were made of the work necessary, and the entrance into the coal fields was decided on. A maximum grade line of .3 per cent. against northbound and .5 per cent. against southbound traffic, compensated for curvature, was decided on, slightly heavier grades being allowed in a few cases, where they could be operated as momentum grades.

The first move was made in 1903, when the Jacksonville & St. Louis Railroad, extending from Jacksonville, Ill., southeast 111 miles to Centralia, was bought. This road had been built originally from Jacksonville to Waverly in 1871 by local capital, and had been gradually extended until it reached Centralia about 1885. It had been constructed as cheaply as possible, being aided largely by grants of right-of-way and bonuses from the towns along the route. For several years it had been bankrupt, and had been allowed to run down, so that it was in very poor physical condition. The track was laid with 56-lb. rail on poor ties with no ballast. All bridges were of timber, with the exception of one steel truss over the Kaskaskia river near Keyesport. It followed closely the surface of the ground, the many grades ranging from 1 per cent. to 1.4 per cent. Going generally southeast, it ran across the direction of traffic and developed but a small local business. The only towns of any importance it reached were Jacksonville, Litchfield and Centralia, all highly competitive.

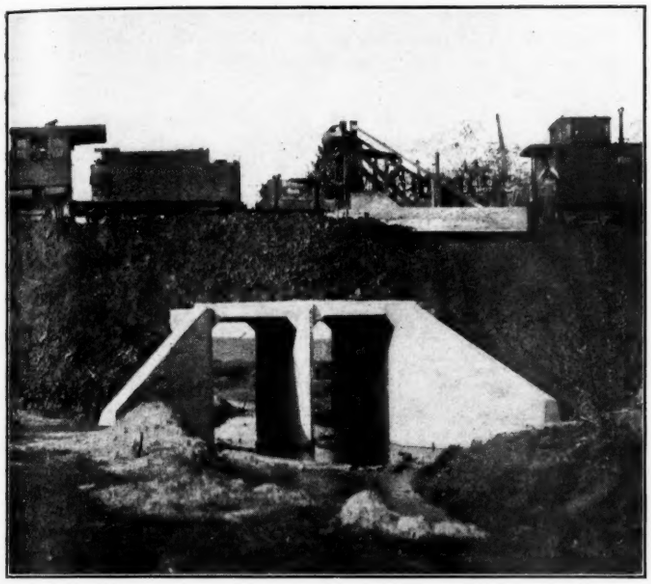


Fig. 2—Double 10 Ft. x 16 Ft. Concrete Box South of Jacksonville.

During the winter of 1903-04 the Jacksonville & St. Louis was extended north 10 miles to a connection with the Burlington's St. Louis-St. Paul line at Concord, 13 miles south of Beardstown, and surveys were made for reduction of grades to the standard above referred to from Concord north through Galesburg to Savanna; also from Jacksonville south to Centralia. During 1905 the Jacksonville & St. Louis was extended south from Centralia 53 miles to Herrin, and connections were made at once with several mines. On the reconstruction south of Jacksonville it was necessary practically to rebuild the entire line. Out of a total of 111 miles re-alinement or grade reduction work was done on over 42 miles, and on the rest of the line it was necessary to rebuild the bridges, widen cuts and fills, and renew the rail and ties. In accordance with the general policy of the road, all steam shovel work along the main line was handled by company forces and equipment, and the only work contracted for was that on part of the cut-offs and light team work along the main line. The regular equipment of 65-ton steam shovels, side dump 80,000-lb. capacity cars, unloaders and plows, and spreaders was used on all main line work, regular train crews from the freight pool handling all work trains. No tracks were built for the temporary diversion of main line traffic while construction work was going on, as many of the cuts and fills were short and interference to traffic lasted but a short time at the one point. Although the coal business began to increase rapidly as soon as the extension south of Centralia was opened, traffic fell off very much during the summer of 1906, owing to a strike in the coal fields, but late in the fall it was unusually heavy and interfered seriously with the construction work. All sags along the old line were brought up under traffic, and in reducing grades the existing main track was also used as a loading track until the first cut was completed alongside, when the track was thrown over into the hole and used as before; while the second cut was taken out under the old main track, after which the track was thrown back to the original line. Since there was only one passenger train each way it was not difficult to arrange the track throwing so as not to interfere with passenger traffic.

As practically all the cut-offs were at stream crossings, where heavy curvature and grades had been introduced on the original line to lower the first cost, the re-alinement at these points included very heavy work, and the banks were built by dumping from construction trestles. Two of the heaviest pieces of work were at Big Shoal and Little Shoal cut-offs, near Ayers, crossing streams of the same names. At Big Shoal two trestles with a total length of 2,961 ft. and an average height of 40 ft. were erected, while at Little Shoal a trestle 2,142 ft. long and averag-

Fig. 3—Routt Street Subway, Jacksonville.

ing 35 ft. in height was built. On this work, as well as on some cut-offs which were contracted, five-yard cars were used, but the other cut-offs, as at Waverly, were built with standard ballast cars working from a trestle.

At Jacksonville the cut-off, extending south from the depot a little over a mile, required over 275,000 yards for the fill. College avenue and Routt street, two important thoroughfares, were carried under the tracks through concrete subways, at both of which hollow abutments were built over the sidewalks, reducing the lengths of the girder spans about 15 feet in each case. This feature is clearly shown in Figure 3. At College avenue additional complications were introduced by the crossing of the Burlington and the Chicago & Alton main tracks over the subway. Figures 4 and 5 being views of this structure. To gain the necessary clearance here the tracks of both roads were raised about 5 ft., at the same time benefitting the grades of both.

As the reconstruction work progressed, timber openings were replaced by reinforced concrete boxes for pipe; the roadbed was brought to the standard of 18 ft. on fills and 22 ft. in cuts; new ties and 75-lb. rail were laid, and 12 in. of gravel ballast was put under the ties. A new gravel pit was opened near Keyesport to furnish ballast for this work. As this was in the clay and hard pan country, special attention was given to drainage and the construction of surface ditches in the cuts, in most cases tiling being resorted to. Four thousand-foot passing tracks were built at intervals of 5 miles and water stations every 20 miles.

Six new water stations were built, the construction in each case being similar. Reservoirs averaging 75,000,000 gal. capacity were formed by earth dams across ravines, these dams being built by contractors with team forces. They were built with a crown of 14 ft. and slopes of 3 to 1 and 2 to 1 on the upstream and downstream faces, respectively. A timber core wall was built through the center, sunk 2 ft. into a muck ditch and extending within 2 ft. of the top of the dam, as a protection against muskrats. Old car sills and timber cut on the reservoir were used as uprights, and second-hand 3-in. plank nailed horizontally to them. The face of the dam was riprapped from 2 ft. above the high water line to the estimated low water line as a protection against wave action. The spill-way was built some distance away from the dam with its outlet entirely free from the toe. The average width was about 40 ft., depending on the drainage area. Three rows of sheet piling were driven across the spill-way at right angles to its axis, one at each end and one in the center, and an apron of riprap was provided at each end, as a precaution against scouring. Figure 6 shows a view of the dam at Concord with the spill-way in the background. All timber below the high water line was removed and the brush burned, and the contractor was required to secure all dirt necessary for the dam in excess of that furnished by the spill-way from the inside of the reservoir and below high water line. The intake was placed on the bottom of the reservoir about 6 ft. above the lowest point and was surrounded by a timber crib. A vitrified pipe line laid on a descending grade led to a circular brick well 6 ft. in diameter located at the edge of the reservoir, the pipe line entering the well about 18 in. above the bottom. The pump house was located near the well, and an 8-in. cast iron pipe line led from here to the tank, in some cases over a mile distant. The power

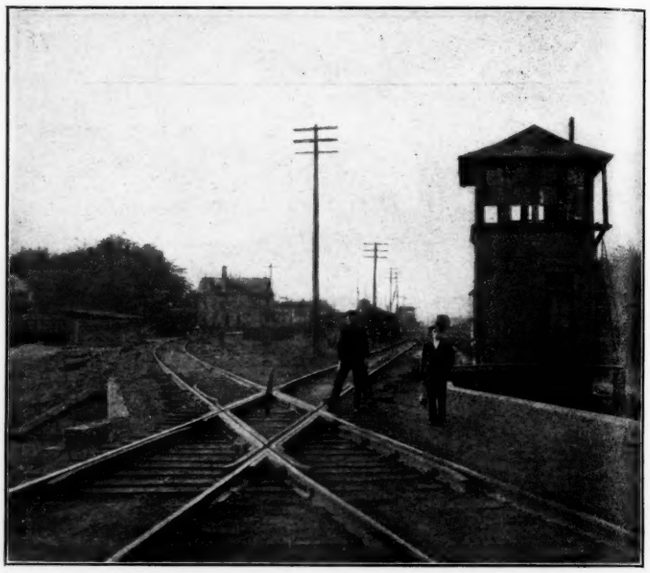


Fig. 5—College Avenue Subway, from Above.

was furnished by a gasoline engine, the size varying with the head and length of pipe line pumped against. The tank was a 30-foot wooden tub of 100,000 gal. capacity and was erected on a steel sub-structure resting on concrete pedestals. Electric connections with the tank float were installed, which automatically shut off the pump when the tank was filled. By means of this latter arrangement, with ordinary traffic one pumper is able to pump for two tanks.

North of Concord the reconstruction was carried on in the same manner as south. This line was built in the early 70's as the Rockford, Rock Island & St. Louis, but acquired by the Burlington many years ago, and it had been maintained in much

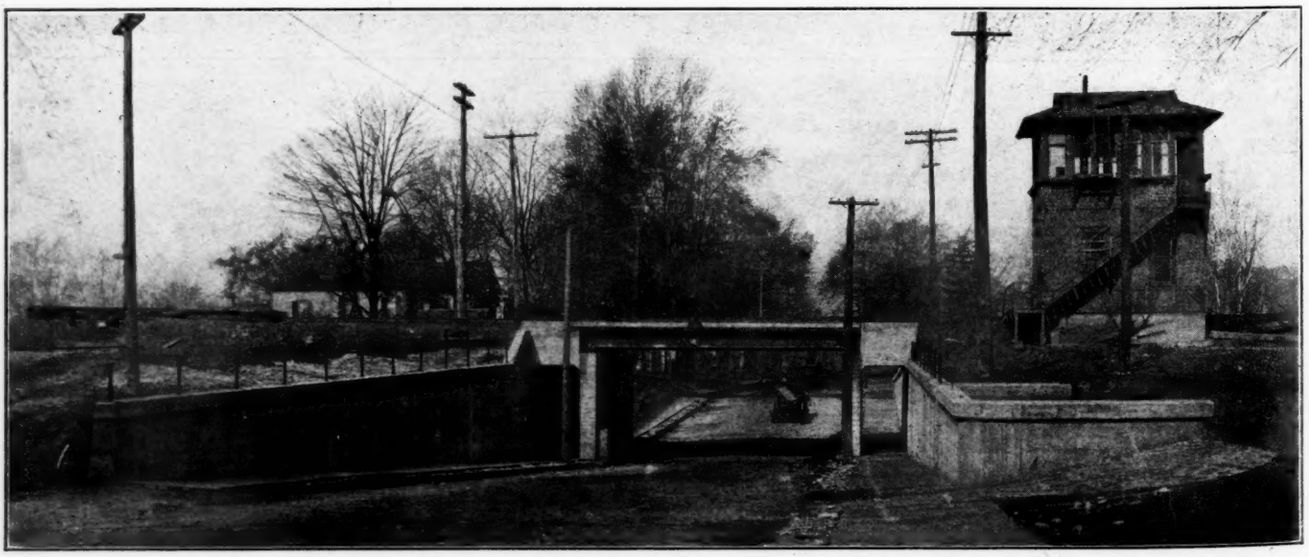


Fig. 4—College Avenue Subway, Jacksonville; Chicago, Burlington & Quincy.

better condition than the Jacksonville & St. Louis, although the grade line was very similar. The grades were reduced to the same standard as south of Concord, new and enlarged water stations were provided, and the entire line gotten in shape for heavy tonnage trains. Especially heavy reconstruction work was done at Astoria, Abingdon to Avon, at Orion and at Fulton, where a 13-mile cut-off was built. At Savanna a 2-mile cut-off was constructed to enable trains to head directly into the yard without a reverse movement. A new terminal with complete facilities, including coal chute, engine house, water station and 700-car yard, was built at Centralia, while the yards at Beardstown and Savanna were doubled in capacity. At Galesburg an entirely new hump yard was built to handle this increased coal business in addition to that collected from the lines west and southwest.

This work is now practically all completed at an expenditure of over $10,000,000, and an operating grade line of .3 per cent. against northbound traffic is now in service from Herrin to St. Paul, with the exception of two points, where the cost of grade reduction is so excessive that it has been decided that it will be more economical to maintain helper engines. Heavier locomotives and cars were purchased, and where the tonnage

Fig. 6—Dam and Spillway at Concord.

rating south of Savanna with the engines in service before the work began was less than 800 tons, the present rating is 3,600, which rating is maintained the entire distance to St. Paul with the assistance of helper engines at the two points mentioned.

That this expenditure has been amply justified is shown by the heavy business developed. Seventeen mines are now directly connected with spur tracks, while other spurs are planned to be built in the immediate future, and much coal is turned over to the road from mines not reached directly. During the past fall over 35,000 tons were handled daily on this branch, and the traffic has become so heavy that a second track is now being seriously considered, the reconstruction work on which was started but five years ago.

During the past year this line has been extended south from Herrin to Metropolis on the Ohio river, and through freight service recently has been inaugurated to the southeast in connection with the Nashville, Chattanooga & St. Louis. Thus, it eventually will form one link of an important line from the north to the gulf ports, in accordance with the general development of the Hill lines along that direction.

This work has been done under the direction of T. E. Calvert, chief engineer, W. L. Breckinridge, engineer maintenance of way of the lines east.

MANNHEIM (CHICAGO) YARD; CHICAGO, MILWAUKEE & ST. PAUL.

During the winter of 1909-10 the Chicago terminals became very much congested, causing great delay to freight in transit, and consequent loss. It has been estimated that the losses sustained by the railways from this congestion from December 1, 1909, to April 1, 1910, amounted to $3,000,000, one prominent railway official estimating that the losses of the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern and Chicago, Burlington & Quincy reached $500,000 each. While this congestion was largely due to a lack of power on the lines west of Chicago, much of it was attributable to lack of adequate yard facilities on several of the roads, resulting in blocking the belt lines, and finally the other lines which were unable to deliver to the belt railways.

While the roads have been making increases in their yard facilities continually, these have not kept pace with the development of the traffic, and the rapid upbuilding of the city has made it impracticable for them to extend their present terminals. As a result, any increase in these facilities must be made further out of the city. The statistics show that the traffic being received at Chicago approximates 4,000,000 loaded cars a year, of which about 775,000 are destined to points beyond Chicago; and about an equal amount is interchange business for points within the city. To avoid congestion this interchange business should be separated from the local business and turned over to the connecting lines as quickly as possible.

Keeping these points in mind, the Chicago, Milwaukee & St. Paul has taken steps to avoid a recurrence of last year's experience by the construction of a new yard at Mannheim, Ill., 14 miles west of Chicago, on its Chicago & Council Bluffs division, to relieve the Galewood yard, 5 miles further in towards the city, where all classification has been previously done. A smaller yard is located at Western avenue, but this is largely used for storage purposes. The St. Paul enters the city by two double-tracked lines, excluding an unimportant branch which extends only to Evanston. The line coming from the north handles the business from Milwaukee, St. Paul and northwest points, while that from the West carries the traffic from Iowa and Dakota points. These two lines come together at Pacific Junction, five miles from the city. All trains in or out on the northern division must come to Pacific Junction and then turn west to the Galewood yards.

The new yard was located at Mannheim largely because of the possibility of securing enough land for a large terminal at this point, and also because of its location with reference to the Indiana Harbor Belt Railway, 20 per cent. of whose stock has recently been acquired by the Milwaukee. This railway has northern termini at Manheim and Franklin Park, one mile east, and extends around the city southeasterly to Lake Michigan, at South Chicago, Indiana Harbor and Gary. By the use of this line a large proportion of the interchange business destined for points east of Chicago can be kept outside the city, enabling the inner belt railway to handle the city interchange business to better advantage.

While only the inbound yard is now being built, it has been so arranged that it will eventually be a part of a complete terminal layout. A similar yard of equal size is planned for outbound traffic, and space has been reserved for complete terminal facilities, including engine house, coal chutes, repair yards, etc., in order to relieve Galewood and Western avenue yards. When this layout is complete it is expected that a cut-off will be built to the Milwaukee division, affording trains from that line a direct entrance into the yard without coming into the city. At the present time the handling of this northern traffic is very inconvenient, for a train from the north coming into Pacific Junction has to go west to Mannheim. The engine and waycar must be returned to Galewood, while

the train is classified at Mannheim, being brought back into the city by transfer engines, the result being a back haul.

The yard is designed as a hump or gravity yard and is unusual in that 44 tracks will lead from one hump, this being one of the largest, if not the largest, yards in that respect in the country. The receiving yard at the west end consists of 16 tracks, averaging 3,600 ft. in length, with a total capacity of 1,360 cars. Entrance from the west is from a third track which connects with the main tracks at Bensenville, about a mile west. A highway crosses this yard at grade near the center, negotiations to move it having not yet been completed. The tracks are built at 13-ft. centers, with the first track 20 ft. from the nearest main line. The grade of the receiving yard is the same as that of the adjacent main tracks. A transverse grade of one-tenth ft. per track sloping away from the main line was introduced to provide for drainage.

At the east end of the receiving yard the Desplaines Valley Railway, the double-track outer belt line which the Chicago & Northwestern is now building, crosses overhead on a pile structure which will later be replaced by a permanent structure with two openings of 100 ft. and 59 ft. at the tracks and 22-ft. clearance above top of rail. As the Northwestern began its improvements first, the Chicago, Milwaukee & St. Paul had to adjust its yard grades to this crossing, limiting the beginning of the approach grade over the hump to this point. This caused some difficulty in working out the plans. The profile over the hump is shown in Fig. 2, the maximum fill being 17 ft. The approach grade from the receiving yard starting from the under crossing of the Chicago & Northwestern is 1 per cent., while that on the other side starts with 30 ft. of 3 per cent., then 105 ft. of .076 per cent., across the scales, followed by a 3 per cent. grade to beyond the first switches on the ladders, after which a 1 per cent. grade extends to the end of the ladders. From this point the grade corresponds with that of the main line, being practically level. In the two months' operation of the yard early in the winter no difficulty was found in handling the cars over the hump, except that for a short time during the construction of the scales, when the cars were run over the south track and through the cross-over, they would occasionally stick on the cross-over. An extra pair of switch points was inserted just above the scale to take care of the creeping of the track and prevent any strain on the scales. A set of 100-ton automatic scales was installed on a concrete base, which in turn, was supported on a foundation of creosoted piles. Electric lights on high poles have been placed along the ladders and a high semaphore has been put at the top of the hump to give signals to the engineer of the hump engine. In riding cars over the hump the rule is to stop each car in the yard a few feet before reaching the next car. Before returning to the hump the rider opens the coupler pocket, and at night he advances the light to the end of the string of cars he rode down. In this way the heavy damage to the cars as well as injury to the employees so common in gravity yards is largely eliminated.

The classification yard consists of 44 tracks leading from the one hump, of which 34 are for general classification purposes and 10 for sorting and storage of grain. It has a capacity of 3,100 cars, of which a capacity of 500 cars is on the grain tracks. In addition, two running tracks from the receiving yard extend around the yard on the south, while another main track starts from this same yard, making in all four main tracks to the city, affording engines a direct outlet for the Galewood terminal after leaving their trains here. The 34 classification tracks lead from two ladders, handling 17 tracks each, with a track between the two groups, upon which a trolley car or engine runs back and forth, returning the riders to the hump. This track runs directly into the main hump track and also connects with the second track on the hump, through a cross-over, so that the trolley can bring the men directly to the top if the switching is being delayed for riders. During the early winter a small locomotive was used on this track, but a gasoline car will be substituted as soon as the yard is completed. A line of double slip switches extends entirely across the north group of 17 tracks to a connection with

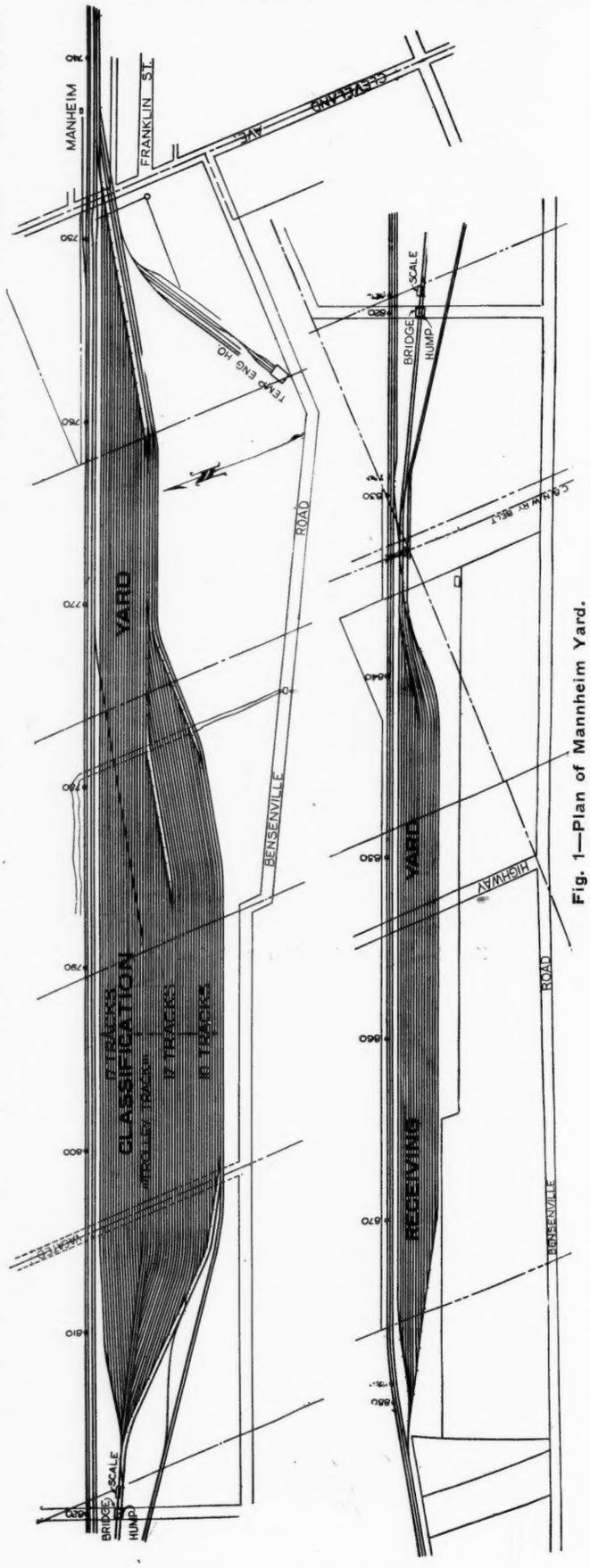


Fig. 1—Plan of Mannheim Yard.

the south main track, dividing this yard into two yards with tracks averaging 2,700 ft. in length. All grain will be placed on the 10 grain storage tracks awaiting shipping instructions. Cross-overs connecting with tracks running around the hump enables strings of cars to be put over the hump again readily when these shipping instructions are received. All tracks in the sorting yard are built to 13-ft. centers, with the first track 33 ft. from the adjacent main track. Along the ladders 20-ft. centers are used except in one case where the trolley track is built 15 ft. from the adjacent ladder on the north. The tracks are built level transversely, drainage being provided by inlets into a double 3½-ft. by 14-ft. concrete box built under the yard near the foot of the grade from the hump. Manholes were built into the top of the box at irregular intervals, and between every third track, and 8-in. vitrified sewers lead into the box on both sides, concrete basins surrounding the top of the sewers being built about one foot below ground level and the basins then being filled to the level of the top of the tie with gravel.

An agreement was made to vacate a highway crossing the classification yard near the west end, and a new road was opened crossing the tracks at the hump, the two elevated tracks being carried over the highway on a reinforced concrete structure of three spans, the roadway span being 20 ft. with two side spans of 13 ft. each. The elevation of the hump was sufficient to provide the required head room with no depression of the highway. The bridge is 40 ft. wide and carries two tracks at 20-ft. centers, with space for a walk for the switchmen on each side. This width of roadway, together with the slopes of the embankment, necessitated abutments 91 ft. long, which were divided into four sections by expansion joints. The piers are of reinforced concrete 2 ft. thick, with stepped footings, the upper step serving also as a hub guard for the protection of the neatwork. The superstructure of the bridge was of slab construction, four slabs of 10 ft. width being required for each span, and all being built in place. The parapets of the slabs were built considerably higher than was necessary to maintain a standard depth of ballast in order to provide for a possible future variation in the grade of the hump tracks.

Temporary facilities are provided at the east end of the yard for the coaling and housing of switch engines only, all road engines going to Galewood. A four-stall frame engine house has been built, together with two 22-ft. clinker pits and an air hoist coaling platform. Three tracks have been provided for a repair yard, where light car repairs can be made. A 6-in. well is now being driven to provide water for engine use. A 70,000-gal. wooden tank will be erected and two cranes installed at the east end of the yard.

Practically the entire yard was built on a fill ranging up to 6 ft. in height, but averaging about 3 ft. Over 500,000 yards of material were required in the filling, this material being brought by train from a large gravel pit near Spaulding, about 20 miles west. Owing to a scarcity of equipment during the early part of the work, flat cars were used, and the unloading was done largely by hand, but as soon as the equipment could be diverted from other construction work, Haskell & Barker cars and Lidgerwood unloaders were used. Every alternate track was laid on the ground and raised to grade, the spaces between being filled by spreading from these tracks. All ladders and turn-outs are laid with 85-lb. rail. No. 10 frogs being used. About half the yard tracks were laid with second-hand 85-lb. rail. The rest is mainly 75-lb. rail, a little 66-lb. rail being used. Creosoted ties were largely used, tieplates being placed on all switch ties and on all soft ties on curves. Two additional main tracks for freight service were built from Galewood to Mannheim, and one from Mannheim to Bensenville.

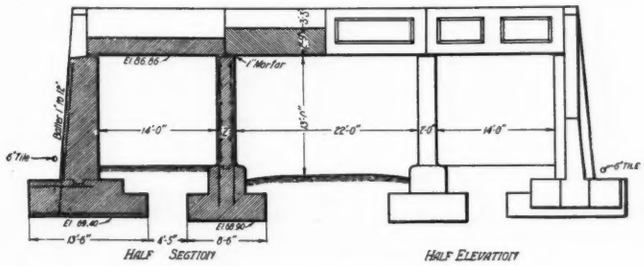


Fig. 3—Section of Bridge Under Hump.

On these tracks new 90-lb. and 100-lb. rails are used on hardwood ties.

While but 28 tracks were completed in the classification yard last fall, the yard was put in service and operated for about two months to handle the heavy business. When the traffic fell off so that the Galewood yard could handle it, operation was stopped until the yard could be completed this spring.

This work was done under the direction of D. J. Whittemore, consulting engineer; C. F. Loweth, chief engineer, and W. L. Webb, district engineer, to whom we are indebted for the foregoing information.

The first sod of the Hodeisa-Sanaa Railway, Arabia, was cut on March 2 by Gen. Izzet Pasha in the presence of several high officials, the foreign consuls, Arab and European residents, and an assemblage of prominent Arab sheikhs and seyds from the neighboring districts. The new railway will form an outlet for Mocha coffee and the hides and skins of the Sanaa region, and may be expected to stimulate both the export of these products and the import of foreign goods.

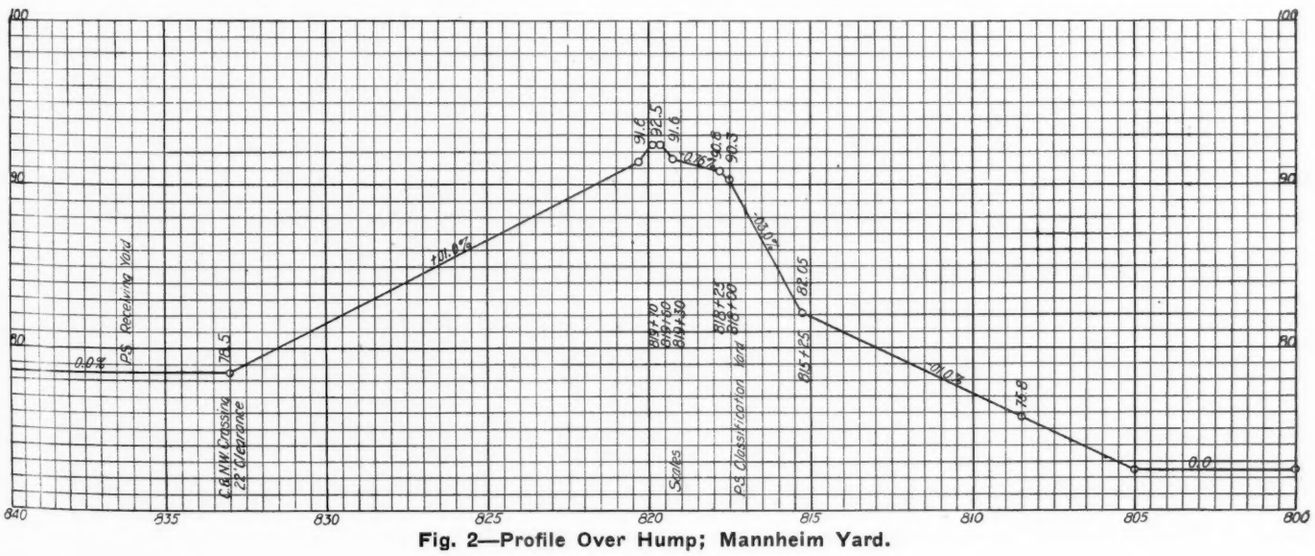
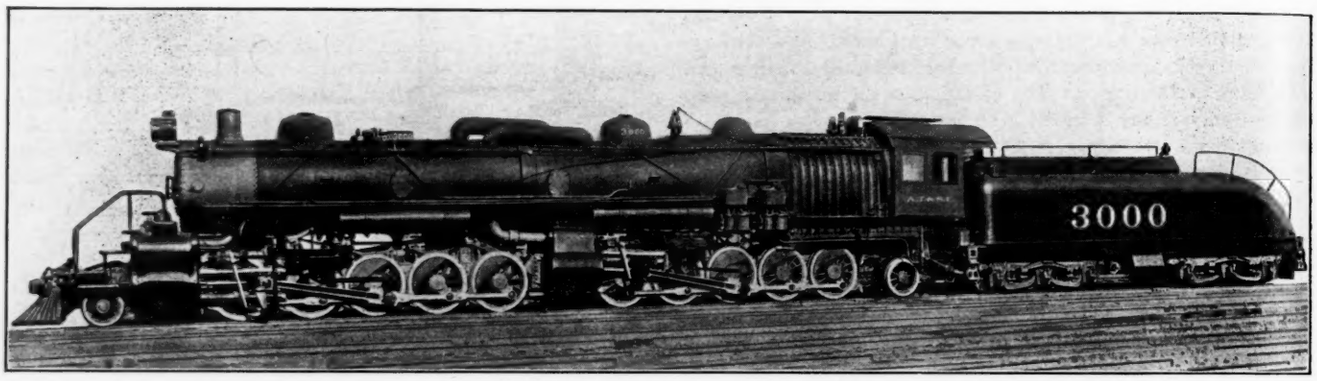


Fig. 2—Profile Over Hump; Mannheim Yard.

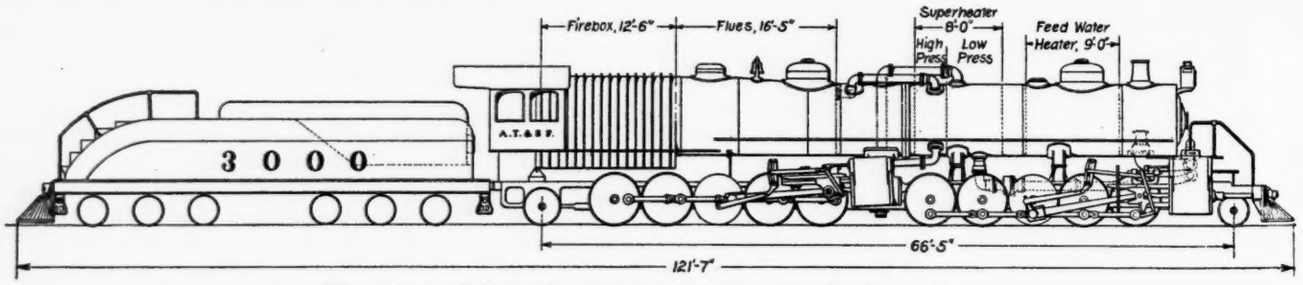
THE LARGEST LOCOMOTIVE.

The largest locomotive in the world, converted from two decapods by the Atchison, Topeka & Santa Fe, as mentioned in the *Railway Age Gazette* of March 31, page 801, is shown in the accompanying illustrations.

It is a Mallet, with the 2-10-10-2 wheel arrangement, and was rebuilt at the Topeka shops of the Santa Fe. The boiler is of the rigid separable type and is equipped with the Jacobs-Shupert firebox, arranged for burning oil, a feed-water heater, superheater and reheater. The total heating surface of 8,466 sq. ft., is proportioned as follows: The evaporating or steam generating surface has 3,920 sq. ft.; the superheater, 580 sq. ft.; the reheater, 1,307 sq. ft., and the feed-water heater, 2,659 sq. ft. The high pressure cylinders are 28 in. x 32 in., and the low pressure 38 in. x 32 in. With a working boiler pressure of 225 lbs. the locomotive will develop 110,000 lbs. tractive effort, which is 1,700 lbs. greater than the 2-8-8-2 Mallet built for the Santa Fe by the Baldwin Locomotive Works in the latter part of 1909. The total weight of the engine is 500,000 lbs., of which 440,000 lbs. is on the drivers. The total length of engine and tender is 121 ft. 7 in., and the rigid wheel base of the locomotive is 19 ft. 9 in. The tender weighs approximately 250,000 lbs. It has two six-wheel trucks, a water capacity of 12,000 gals., and an oil capacity of 4,000 gals. The tender is not exceptionally high and is curved at the back. The latter feature is to reduce the wind resistance and the former to allow the engineer to look over the tender, for the engine is so long that it is necessary to run it backward to permit the engineer to have the necessary view of the track. Three of these locomotives have been rebuilt at the Topeka shops, and are in service on the mountain grades in Arizona.



Mallet Locomotive Converted from Two Decapods; Atchison, Topeka & Santa Fe.



Dimensions of Converted Mallet; Atchison, Topeka & Santa Fe.

The Chilean government has 1,491 miles of railway under construction at an estimated cost of $74,933,300. The work already done on these lines has cost $24,645,790. In addition to the foregoing, there are 694 miles of railway under consideration. When these lines are completed the government will control about 3,600 miles of railway. Parties desiring to get in touch with this work should correspond with the Director General de Industrias y Obras Publicas, Santiago, Chile.

NEW RAILWAY LAWS IN MAINE.

The Maine legislature, which adjourned on March 31, passed a considerable amount of railway legislation, but the most important events of that kind were the omissions, the bills rejected; notably the proposed law for a public utilities commission to take the work of the present railway commission and have supervisory authority over other forms of public service corporations. Among other measures that failed were several labor bills, including further restrictions on the trustee process and the repeal of the fellow-servant, contributory-negligence and assumption-of-risk doctrines. Still other defeated measures include the proposition to tax railways on a valuation basis, to make preferred stock of the Boston Holding Company a legal investment for Maine savings banks, and a bill for a state income tax.

The laws enacted included the following:

For a commission to investigate the question of savings bank investments.

Favoring a federal constitutional amendment for an income tax.

For the state to maintain a fire patrol along the railways in unorganized townships during times of drought, the cost to be collected from the railways.

To require granting of licenses by fish and game commission before live fish or game may be transported from the state, and another law for tightening of the similar restrictions on dead fish and game, and limiting the amount.

For compulsory weekly payment of wages.

To make a holiday of Columbus day, October 12.

To forbid removing packing or waste from locomotive or car journal boxes; penalty $500 fine or three years imprisonment, or both.

To allow free transportation of policemen and firemen.

To authorize street railway locations on private lands when "it appears that the public service of said corporation would thereby be better performed," an act granted for the benefit of electric railways which wish to handle freight.

To require shop accidents to be reported to the state labor commissioner.

To authorize courts to appoint directors of corporations when election at a stockholders' meeting fails.

For slight increases in the excise taxes on railway, express and telegraph companies.

To add breaking the seal of a car to the list of offenses included in malicious mischief.

To provide for decreasing stock of corporations by first cancelling unissued stock.

To add secretary and assistant treasurer to list of officers authorized to issue stock certificates.

To make it a misdemeanor to fail to pay fare to a common carrier of passengers, even if the fare is not demanded.

A more stringent fire escape law, so drawn that it applies to offices in the second story of a building.

To provide that a real-estate agent's contract for sales of property shall be void after one year, the law being so drawn that it would include bargains for rights of way or yard or station room.

To authorize one member of the railway commission to make physical examinations of railways.

To exempt mortgages from taxation except a recording tax.

To regulate transportation of corpses of persons who died of infectious diseases.

For advertisement of corporations delinquent in payment of annual franchise taxes.

To require foreign corporations to pay an annual license fee for doing business in Maine.

The Bangor & Aroostook was granted the right of eminent domain for the proposed 157-mile extension through the woods from West Seboois via Nahmakanta, Chesuncook dam, Chamberlain lake, Pokumkeswawgamokesis lake and the east bank of the Allegash river to St. Francis.

A charter was refused for a bridge to allow Canadian railways to enter the town of Van Buren.

A charter was granted the Eastern Maine Railroad to build a nearly direct line from Brewer via Bancroft to Houlton, thus invading Bangor & Aroostook territory. At the committee hearing it was asserted that this would violate Bangor & Aroostook prescriptive rights, and the answer was that that was a question for the courts.

Charter rights were granted the Aroostook Valley Railroad, an electric line, for the acquirement of the Presque Isle branch of the Canadian Pacific and electrifying the same; for building an extension from Washburn via Woodland to New Sweden, and another extension from Woodland to Caribou; also for an extension from Washburn to the west line of the state adjoining L'Islet county, P. Q., which would give a short line from Quebec to the salt water at St. John, N. B. These were opposed by the Bangor & Aroostook.

The name of Portland Union Station Company was changed to Portland Terminal Company, and rights confirmed, including equal ownership by the Boston & Maine and Maine Central. Eminent domain powers were granted for enlargement of yard and for land for erection of shops, and also right of electrification.

The Wiscasset, Waterville & Farmington (narrow-gage) was granted the right to abandon its line between Weeks' Mills and Winslow, where it has electric competition, and an alternative bill was passed for reviving the charter of Waterville & Winslow Bridge Company, to build a bridge by which the W. W. & F. may enter Waterville.

A charter was granted to the Lubec, East Machias & Machias, and similar charters to the Farmington & Augusta and Knox County Central (from Friendship via Union to Belfast), all of which charters allow option of steam or electric power.

Authority was granted to the Maine Central Railroad for absorption of its subsidiary roads, the Washington County, the Sebasticook & Moosehead and the Somerset. An attempt was made to couple with this a provision for a compulsory perpetual two-cent passenger fare, but it was defeated. Charter rights were renewed for the Rangeley Lakes & Megantic, a Maine Central subsidiary which proposes to build from Oquossoc, Me., to Megantic, P. Q.

Charter renewals were granted three companies which propose to use either steam or electric power—Ocean & Northern to build from Gouldsboro, Lincoln County to build from Wiscasset or Damariscotta to Boothbay Harbor, and Winter Harbor & Eastern, and Penobscot Bay to build from Castine.

Charter renewal was granted the Bethel & Rumford Street Railway Company, and to a large number of other electric railway companies.

ELECTRIC VS. STEAM LOCOMOTIVES ON THE NEW HAVEN.*

BY WILLIAM S. MURRAY.†

The religion of this article is to preach the doctrine of universal use of single-phase current on trunk line roads inclusive of suburban and terminal territory, as applied to freight and passenger operation, and I offer for consideration the standardization of 11,000 volts on the contact wire and a system frequency of 25 cycles. The 11,000 volts on the contact wire is advocated for application on railway right-of-way which may be adjacent to foreign road territory to permit of one company's equipment operating on the right-of-way of another. This voltage is recommended as a minimum potential; it being recognized that there is no objection to a higher voltage on other lines individual to themselves where transmission economy can be obtained by the use of the higher voltage.

Recommending 25 cycles as standard for single-phase electrification is not so much based on the successful use of this frequency on the New Haven road as on my belief that the future will undoubtedly see single-phase locomotive induction motors and probably single-phase current received at the terminals of the locomotive and transformed into direct current without the use of any rotating element within the locomotive. If 15 cycles, as some have been prone to recommend of late years, be elected as a standard frequency, it would handicap, if not eliminate, the oportunity of obtaining one of these two highly desirable alternatives entirely within reach by the use of 25 cycles.

The whole problem of electrification, if viewed from the point of whether it is to pay, settles down to how much it costs to produce the necessary tractive effort required in the passenger express locomotive, the passenger local locomotive, the freight road engine, and the freight switch engine, together with such other costs incident to the electrical system. The writer, during the past four years, has had the opportunity of studying these four classes of steam locomotives. The electrical man must realize that to make his electrification pay he must be able to reproduce the four classes of steam tractive efforts by electricity, with a total investment, the interest on which must be carried by the economies to be effected over steam operation. Numerous steam locomotive tests were made between New Haven, Conn., and New York for the purpose of obtaining data as the power required. Incidentally it was shown that it takes 0.169 lbs. of coal, 0.194 lbs. of coal and 0.335 lbs. of coal to produce a ton-mile in freight, express passenger and express local passenger service respectively.

The data obtained which were most interesting to the writer were the indication of the size of locomotive required to accomplish express and local schedule between New Haven and New York. The horse-power per ton of train movement immediately afforded a check on the capacity of the engine required, showing the normal size of unit to be elected, which, under an arrangement of multiple unit control, permitted the proper amount of engine power to apply to trains of varying weight; the other data most interesting and important to the writer was the water

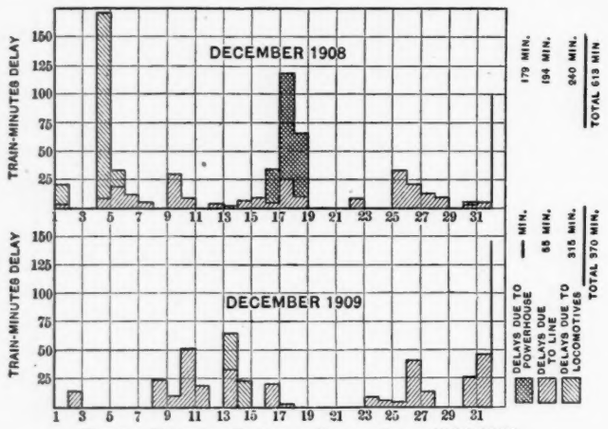
* Abstract of a paper read before the American Institute of Electrical Engineers at Toronto, Can., April 9, 1911.

† Electrical engineer of the New York, New Haven & Hartford.

consumption, giving a close check on the relative energy requirements between express and local service. This analysis of the steam engine under operation for trunk line conditions incident to the New Haven, caused us to choose for our passenger unit a locomotive, the normal capacity of which was 1,000 h. p. at the rim of the locomotive wheels, and this size in practice has borne out our estimate of the capacity required.

Studying the freight engine requirements of a trunk line, from a steam locomotive point of view, I had a series of tests made on typical freight engines, the runs being over a distance of 55½ miles, and in this case trains varying in weights between 720 and 1,500 tons, including weight of engine, were used. The figures obtained show that the average evaporation of water per pound of coal is 6.9; that the average indicated horsepower varied from 655 minimum to 892 maximum and the average speed varied from 23.5 miles per hour minimum to 31.5 miles per hour maximum.

The electrical locomotive which we have designed to handle our general class of freight service, or what could be correctly called our electric freight road engine, has a normal horsepower rating of approximately 1,400 h. p. This capacity provides a margin above the requirements indicated by the tests. The excess capacity, however, is highly desirable in virtue of its affording the electric locomotive an opportunity to operate heavier trains and at a higher schedule speed than the steam

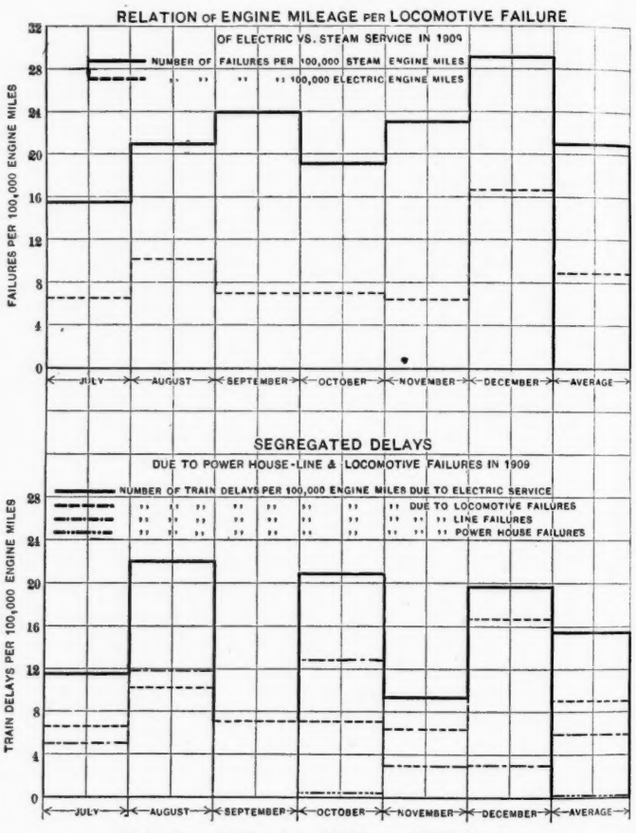


Train Minute Delays, December 1908-1909.

locomotive it replaces. A series of tests were made on electric freight locomotive 071 operating between Stamford, Conn., and New Rochelle, N. Y., hauling a dead steam locomotive with 37 freight cars and a caboose, the total weight of the train being 1,438 tons. The average speed over a distance of 1,675 miles was 36.5 miles per hour, the average kilowatt input being 1,487 k. w.. with an average rim horse-power at the drivers of 1,650 h. p.; notwithstanding the locomotive was dragging a dead engine throughout this run, it accomplished the work at an average energy rate of 25.9 watt-hours per ton-mile. Not uninteresting is the flexibility offered by the electric over a steam locomotive, in noting that its limitation of service is not absolutely confined to one class.

By far the most interesting investigation of the four types of steam engines employed in trunk line service was that of the steam switching locomotive. In the many yards of the New Haven lines none afforded a better opportunity to study this type of engine than at Harlem River, where the duty imposed on the switching locomotive, beside that of classification, included also float work, calling into account the necessity of heavy drafts of power and sustained for periods longer than usual to other switching yards; but even with this additional duty to perform, the relatively small amount of energy required for this work was a great surprise. From April 8 to April 29, 1910, careful observations for twelve days of switching movements were made on our switch engine 2,392, nine days of which were in the Harlem River yard and three in the Oak Point yard.

Careful measurements of coal weights were made, in order to secure the resulting rate of evaporation which was noted to approximate seven pounds of water per pound of coal. As an interesting record of the practical method of coaling a switching locomotive for an eight-hour shift, the words of the engineer are quoted in his report with reference to these tests: "About a half-hour before going to work each morning the tank was loaded with 8,000 lbs. of hard coal. The engine was then taken to the pit and the fire cleaned, and a new fire of coal built. To build this first fire required about 2,500 lbs. of coal, and the engine worked on it for about three hours. At the end of three hours the grates were shaken and the fire dressed and built up with about 1,500 lbs. more coal. This second fire lasted about two hours, and at the end of that time the grates were again shaked, fire dressed and the third and last fire built. This required about 1,500 lbs. and lasted until the finish of the eight hours' work. After the day's work was completed the engine was taken to the house and enough coal left in the tank to keep the fire until the next morning when the engine went to the pit to have fire cleaned and built up for the day's work."


RELATION OF ENGINE MILEAGE PER LOCOMOTIVE FAILURE
OF ELECTRIC VS. STEAM SERVICE IN 1909
NUMBER OF FAILURES PER 100,000 STEAM ENGINE MILES
" " " " 100,000 ELECTRIC ENGINE MILES
FAILURES PER 100,000 ENGINE MILES
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
AVERAGE
SEGREGATED DELAYS
DUE TO POWER HOUSE-LINE & LOCOMOTIVE FAILURES IN 1909
NUMBER OF TRAIN DELAYS PER 100,000 ENGINE MILES DUE TO ELECTRIC SERVICE
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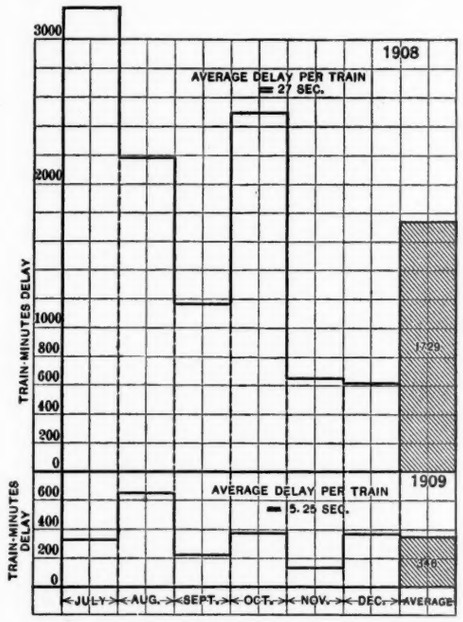
TRAIN DELAYS PER 100,000 ENGINE MILES

Relation of Engine Mileage to Failure.

It would be to go ahead of our story to speak of an electric switcher here, but does not the above described operation suggest it? Again, space does not offer the opportunity to discuss the hourly movement of the engine in the yard. One brief paragraph from the testing engineer's report will suffice: "When not pulling and loading floats the engine was employed making up trains to load floats, and doing other miscellaneous work." Not uninteresting, too, is the closing paragraph of his report, which is as follows: "On following the work of engines, one is forced to the conclusion that the ratio of weight to tractive effort is too low. This may be due to poor trackage, road-bed, etc., but even with sanded rails and all other conditions available the engines are inclined to slip, thus losing time in accelerating. This is a bad fault in a switching locomotive.

and especially bad in such yards as Harlem River and Oak Point, for since the speed is limited and the coupling, uncoupling, connecting air, etc., can be only done so rapidly, the only method of increasing the amount of work done is to increase the accelerating power of the engine used." There is, of course, this much to be taken into consideration—that the more constant torque of an electric locomotive accelerating a drawbar pull would have less tendency to slip than a steam locomotive accelerating that same pull.

It was shown that the average horse-power during the time the throttle was open was approximately 313; but it was noted that the engine was developing power for only 36.7 per cent. of the time, and thus the average energy developed during the hour was approximately 115 h. p. The reduction of the energy developed by a switching engine to an average of 115 h. p. has been something of a revelation to the writer, and the two most important things it suggests are: That in switching, yard speeds can be greatly increased by the use of an electric switcher of very much less engine capacity than that used in the steam switcher. On account of the low average rate of energy required for their operation, a central power station will deliver



Tabular Summation of Train Delays.

at far higher efficiency the power necessary to the electric switching engine, than that obtained from the power plant individual to the steam switching engine itself. Immediate application of this statement is seen in the ratio of the pounds of coal burned to the number of horse-power-hours developed, which is seen to be 6.4. Increasing this by the coal burned during the idle hours of the engine, this ratio approximates 8. It has been demonstrated that the ratio between the coal burned for operating passenger trains by electric, rather than steam locomotives, is 1 to 2. In the case of switching engines this rate is much greater, a figure of 1 to 3 being conservative.

In the paper entitled The Log of the New Haven Electrification, presented before the A. I. E. E., by the writer in December, 1908, there was given a table of train minute delays with their causes and a set of graphical charts supplementing them, which gave a fair idea of the general character of the service resulting in the early days of operation shortly after the construction had been sufficiently advanced to permit a trial of full operation between Stamford and New York City. For comparison a table and chart for the month of December, 1908 and 1909, is shown herewith. The most interesting thing to note in this table of more recent operation is the disappearance of delays. The total train minute delays for the six months' consecutive operation in 1908 were 10,373 train minutes; and summing up the train minute delays for the corresponding six months' consecutive operation in 1909 we find the train minute delays to be 2,076. Thus, the train minute delays for the six months of 1909 were one-fifth of the train minute delays for 1908.

In the summation sheet it is interesting to note as a more intimate acquaintance with the system's characteristics and a better knowledge of the details that needed correction or change were impressed upon us in the regular log of operation, the train minute delays steadily decreased, with the exception of one month (October, 1908,) in which, as brought out in the author's previous paper, there was a serious power house delay, due to the explosion of an oil switch. The delays as shown for the six months of the year following show the system's stability of operation, and this was anticipated by those who had not composed its obituary in the early days of its first trial.

A comparison of the 1909 to the 1908 train minute delays is immediately indicative of the fact that even in this short time the disturbing factors of the system had disclosed themselves and had been eliminated. Eighteen months after commercial service was inaugurated our electrical failure report shows a record of over 15,700 miles per engine failure. Between November 2 and 23, 1909, 66,000 electric locomotive miles were run, and this mileage, which is approximately eleven round-trips from New York to San Francisco, was accomplished with a total of three minutes' delay.

These same eighteen months have yielded an abundance of new information concerning the characteristics of the system, inclusive of power house, line and locomotives. Though all of these departments contributed their share of train delays in our initial operation, the unlooked for troubles, which while not in any way fundamentally attacking the principles of the system, reflected upon it, for traffic delays are always a good factor in the public estimate and have sometimes been misapplied as arguments against the system by those who should have discriminated between the incidental and the fundamental.

An interesting relation between failures for trunk line service of electric vs. steam operation, is shown in the accompanying chart. As is to be noted in the lower diagram of the figure, the power house failures in its effect on engine mileage is almost nothing. On account of the severe handicap that has been placed on the overhead wire by steam locomotive stack discharges directly beneath it, a number of failures per 100,000 engine miles are recorded. An elimination of the steam service under the electrified wires will greatly reduce, if not entirely eliminate, failures due to this part of the electrical system. In the upper diagram of the figure is shown the relation of electric engine mileage per failure vs. steam mileage. It is to be noted in this that the electric locomotive failures are nine per 100,000 electric engine miles, while the steam, which is an average figure for all of the divisions of the New Haven, is 21. Thus, it would seem that the electric locomotive service is 133 per cent. better than the steam.

FOREIGN RAILWAY NOTES.

The plans submitted by the Southern Railway for the construction of an industrial branch to the Tandil quarries have been approved by the Argentine government.

The plans, details and descriptive report, submitted by the Southern Railway, covering the northern section of the branch which it will build from Olavarria to Vela, have been approved by the Argentine government.

The president of the Argentine republic has approved the report made on the construction of the section of the branch line of the San Antonio Railway comprised between Corral Chico and Maquinchao. The total cost of this branch is estimated at $3,799,050.

General News Section.

The small shops of the Boston & Maine, at Sanbornville, N. H., were destroyed by fire April 8. Loss, $50,000.

Frederick A. Delano, president of the Wabash, has been elected president of the Commercial Club of Chicago.

The Canadian Pacific intends to start 50 new towns on its line in western Canada this year; the Grank Trunk Pacific 24 towns; and the Canadian Northern 96.

In the Federal court at Indianapolis the Baltimore & Ohio Southwestern has been fined $225 for violations, in 1909, of the law forbidding trainmen to be kept on duty more than 16 hours.

The legislature of New Jersey has appropriated $500,000 for the purchase of a right-of-way, which it is proposed to present to the federal government, for a ship canal across that state from Bordentown to Raritan bay.

The legislature of Ohio has passed the Winters' Public Utility Bill, enlarging the powers of the state railway commission and giving it control over all public utilities except those which receive their franchises from city authorities.

The Vandalia Railroad during the past three years has had no passenger killed in a train accident. The number of passengers carried was 9,800,030. The number of passengers injured in train accidents during the three years was 67.

The Canadian Railway Commission, according to a press despatch, asks the attorney general to prosecute the Canadian Northern for operating a branch line in Manitoba before being authorized to do so. The penalty for this offense is $200 a day.

The government has filed suit in the Federal Court at St. Joseph, Mo., against the Chicago, Rock Island & Pacific to recover $30,000 for alleged violations of the nine-hour law governing employees engaged in operating and despatching trains.

Suit has been filed in the United States district court at Guthrie, Okla., by United States Attorney Embry against the Atchison, Topeka & Santa Fe for violation of the hours of service law. A total of $29,500 in penalties is demanded by the government from the Santa Fe.

The Atchison, Topeka & Santa Fe has notified its employees that they must not assign their wages or execute powers of attorney to others to collect for them. Violation of the rule will be sufficient cause for dismissal. Employees must not accept assignment from other employees.

The Reading-Central of New Jersey line last week ran a special train of 10 cars, carrying the musicians of the Metropolitan Opera House, from Philadelphia to Jersey City, 90 miles, in 102 minutes. This is only four minutes longer than the time of the regular four-car and five-car trains.

Local newspapers report that the Empire state express of the New York Central one day last week was run from Syracuse to Buffalo, 149 miles, in 140 minutes. Train No. 11, the Southwestern Limited, recently traversed this distance in 137 minutes. Train No. 11 leaves Syracuse at 8.26 p. m.

The number of bills affecting railway operation which have been introduced in the legislature of Iowa this year is 10. This item is given by way of supplement to the tabular statement printed in our last issue, showing bills introduced in 36 states. With Iowa included, the total number of bills introduced in all the states is 484.

The Chicago Engineers' Club has leased the property at 318 Federal street, Chicago, for a term of ninety-nine years. It is stated that the three-story building now on this property is to be enlarged by the addition of four stories and that the lower three floors will be sub-let to a restaurant company, the fourth and fifth floors to be used for the Engineers' Club, the next floor for bedrooms for visiting members, and the top floor to be rented.

The Washington State Chapter of the American Institute of Architects, at its meeting in Seattle April 5, elected as an honorary member of the chapter, Virgil G. Bogue, C. E., of New York. Mr. Bogue has been advisor to the Municipal Plans Commission, which has under consideration an elaborate scheme for the development of Seattle, and the action of the architects is in recognition of what he has done in connection with that work.

The Brennan monorail car which was on exhibition at the Coliseum in Chicago during the recent convention of the American Railway Engineering Association is to be given to Cornell University, Ithaca, N. Y. This is in accordance with the vote of the railway officers who visited the exhibit. Ernest Merritt, dean of the graduate college of the university, has written to the secretary of the Railway Appliances Association, accepting the gift and saying that it will be a welcome addition to the gyroscopic appliances of the university.

Supplementing the recent announcement by the New York, New Haven & Hartford, that some of its passenger trains would be run, with New Haven engines, over parts of the Boston & Albany, it is now announced that during the coming summer the through trains between New York City and Portland, Me., will be run by way of Springfield and over the Boston & Albany between Springfield and Worcester, 54 miles. Whether New Haven engines and men will run over this section of the Boston & Albany is not stated.

The Western Electric Company has sent to the Seaboard Air Line a supply of telephone equipment for new lines aggregating over 600 miles; namely, Hamlet, N. C., to Wilmington; Hamlet to Columbia; Hamlet to Rutherfordton; and Jacksonville, Fal., to Tampa, Orlando and Venice. Orlando and Venice are on branches and the branch lines will be connected to the office of the despatcher at Jacksonville only when a communication is to be sent, and the selectors on the branches will not be operated when the despatcher calls stations on the main line. The Seaboard Air Line was the first road in the southern states to use telephones extensively in train despatching.

The Central Safety Committee of the Chicago & North Western in summing up the work of the safety committees for the nine months since the organization of the committees, which ended April 9, reports a total of 228 persons killed on the North Western lines, as against 275 for the same period of the previous year, a decrease of 17 per cent. The number of persons injured decreased 15 per cent. Of the persons killed, 75 were employees, and in this item there is a diminution of 17 per cent. The number of passengers killed increased from 5 to 14. "Other persons" killed decreased from 180 to 139, or 23 per cent.; employees injured decreased 13 per cent.; and passengers injured decreased 33 per cent. "Other persons" injured decreased from 470 to 441.

W. D. Williams, a member of the Texas railway commission, has written a letter to Senator LaFollette of Wisconsin giving his ideas of what the bill relating to the valuation of the railways of the United States should provide for. The bill now provides for a "fair" valuation and Mr. Williams thinks that term too indefinite; that it might mean market value, commercial value, reproduction value or several other things. He hopes the bill will be changed to provide for an "investment valuation," which would show the amount of money originally put into the property, and as the amounts spent for betterments and additions from time to time could be added to the first value, the actual value could be known at all times. He thinks this would be the real value and would afford an absolute basis for rate-making if the Interstate Commerce Commission decided to use it for that purpose.

On the evening of April 5, about 8 o'clock, passengers in train No. 27 of the Cleveland, Cincinnati, Chicago & St. Louis, were robbed of about $300 as the train was entering Muncie, Ind. The robber suddenly appeared in the passenger car,

intimidated the passengers with a pistol and jumped off the train within five minutes. A passenger fired at the robber as he got off, and the conductor of the train was shot at by the robber. A robber boarded a passenger train on the Iron Mountain road within the city of St. Louis on the night of April 7 and robbed the steward of the dining-car of $40. An express messenger was robbed on the same section of the road on the night of February 28. An interurban electric car was stopped by two robbers at Ivanhoe, near Los Angeles, Cal., on the night of April 4, and its 30 passengers were robbed of about $500. After the passengers had been robbed they were ordered out of the car, and the motorman was compelled to carry the robbers forward about one mile, to a point within the city limits, where they left it and fled.

The Pennsylvania State College, State College, Pa., offers an option in railway mechanical engineering to the fourth year students in the mechanical engineering course which aims to prepare them for the engineering and operating departments of railways. It provides considerable theory and practice in locomotive design and operation. The college has exceptional opportunities for carrying on this work, in that it has access to the Altoona shops of the Pennsylvania Railroad, which are only 60 miles from the college. The Pennsylvania testing plant and dynamometer car have been used for tests in the past two years. The special locomotive equipment at the college includes a locomotive completely fitted for tests, operating on 20 miles of track; Westinghouse and New York air-brake test racks; switch and signal apparatus, and locomotive detail drawings. Special lectures have been given by F. H. Parke of the Westinghouse Air Brake Company, by Geo. R. Henderson of the Baldwin Locomotive Works, and by others prominent in the railway world. The course is under the direction of Prof. Arthur J. Wood, who has had a broad experience in both teaching and railway engineering practice. The students taking this work are required to spend a summer vacation or its equivalent with some railway or locomotive company.

An Exhortation to Efficiency.

Edmund Pennington, president of the Minneapolis, St. Paul & Sault Ste Marie, has issued a circular to employees asking closer application, attention to detail, courtesy and the cultivation of the good will of the people. The circular reads in part as follows:

"The constant reduction in rates and the increased cost of labor and material have made it necessary to reduce our transportation expenses as much as possible. To do this we have made large expenditures in the last few years in reducing grades, securing heavier and more improved power and equipping shops with modern tools, until the limit has about been reached. The earnest request by the railways for an increase in rates having been denied, an effort must be made to further reduce the cost of operating the road, and as I look at it the only thing left is to increase the efficiency of each and every department. No doubt considerable saving can be made by the head of each department in studying his department thoroughly to see if greater efficiency cannot be obtained."

Smooth the Passenger's Way with a Thoughtful Suggestion.

J. M. Connell, general passenger agent of the Atchison, Topeka & Santa Fe, has sent to all passenger employees the following letter on courteous treatment of the public:

"Let none of us seek opportunity to humiliate a passenger through an assumption of superior knowledge or an exacting or sarcastic attitude; as for illustration: A passenger rushes up to the window and demands to know the time of the next train west. Don't draw his attention to the vast area located to the westward, and point out the impossibility of your anticipating to what particular point he is destined; or, being technically inclined, give him the time of departure of the next train west, regardless of conditions whether it is a local train or a limited. This attitude is not clever.

"Place yourself in the passenger's position; realize that the apparent thoughtlessness of his question is not intended to annoy you, or to give you an opportunity to enjoy your humor at his expense. Endeavor to consider his questions intelligently, and appreciate their true import. Answer him courteously and patiently. Perhaps your hurried passenger is destined upon an unpleasant or sorrowful journey; do not make his discomfort more poignant by the unfriendly and hostile attitude, but be glad to smooth his way a bit with a kindly word or thoughtful suggestion.

"We often have inexperienced passengers whose journey makes it necessary to change cars one or more times. Take pains to show them their route, and explain what time their train leaves the junction point, how long they will have to wait at such point, etc.

"It is a good plan, especially in the case of aged people, to take a timetable and mark with pencil each train the passenger is to use, also junction point. This information, with the assistance of our conductors, will give the passengers the experience of traveling without worry. * * *

"Never allow any personal feeling toward a prospective passenger or inquirer for information to enter into business, but bear in mind that you are not acting for self individuality, but as the representative of the company, the principal motive being to maintain good will between the company and its patrons."

Bureau of Explosives.

The Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, 24 Park Place, New York City, has issued the annual report of chief inspector B. W. Dunn, giving a review of the work of the bureau for the past year, and statistics for the past three years. The membership of the bureau now includes 194 railways, 11 steamship lines and two express companies. The total number of inspections made by the bureau in the year ending December 31 was 18,615, made up as follows: Inspections of stations, 15,986; of factories, 315; of magazines, 1,528; of steamship piers, 139, and of cars in transit, 647. The most significant item in the statistical table, that showing the total number of boxes of high explosives condemned as unsafe for transportation, remains large; 10,902 this year and 10,029 in the preceding year. One thousand two hundred and ninety-one kegs of black powder were condemned (1,468 kegs in the year preceding). The total number of persons killed by explosions in transit has been as follows: In 1907, 52; 1908, 26; 1909, 6; 1910, 1.

Colonel Dunn says that practically all storage magazines have now been discovered and have been brought under the supervision of the bureau, so that he expects to see a decrease in the number of defective packages offered for transportation. Much work has been done during the past year in improving the regulations for the transportation of inflammable articles and acids. There is much difficulty in this work because of loose practice in describing shipments. It is hoped to get the Interstate Commerce Commission to approve strict rules for the description of dangerous articles, and if such a rule is thus approved, it will have the force of law.

Colonel Dunn recommends the use of metal barrels for the transportation of gasolene, benzine and naphtha and metal cans for inflammable liquids. He finds that many breakages of carboys are due to the poor quality of the glass of which they are made.

After making extensive inquiries covering many countries, Colonel Dunn has prepared a schedule of minimum distances which should be maintained between magazines used to store explosives, and inhabited buildings or public railways. For example, a magazine containing 1,500 pounds of explosives should be not less than 600 ft. from inhabited buildings, or 360 ft. from a railway; but these distances are for cases where there is either a natural or an artificial barrier between the magazine and the house or railway. If there is no barrier the distances should be at least doubled. Many magazines are improperly located, and where the owner does not willingly remove them, application should be made to the courts to declare the magazine a nuisance.

The bureau is slowly getting into touch with the express business, where it is found there is much need for improvement. Regulations were issued by the express companies last summer, but they have not been well carried out.

Rough treatment of cars containing explosives is declared to be the most serious menace to safe transportation at the present time. Trainmen see that rough handling does not produce any visible injury to cars and so they do not reform their practice.

Disaster is certain to ensue if trainmen are not made more careful. A single explosion would quickly reverse the favorable records of the past two years. If no other means are successful, careless trainmen ought to be prosecuted criminally under section 235 of the act of March 4, 1909. Notes are given of seven serious cases of rough treatment of explosives in cars during the past year. Several shippers have been prosecuted criminally during the past year for clandestinely transporting explosives on passenger trains. Colonel Dunn and his assistants have continued to give lectures to railway employees throughout the country, and he has issued an illustrated pamphlet, showing how to load explosives properly. This pamphlet costs 20 cents a copy; 15 cents each for 100 copies; 10 cents each for 1,000 copies; 5 cents each for more than 1,000. The report has 120 pages of appendices, containing instructions for loading, geographical information, etc.

New Railways in Texas.

Reports made to the engineering department of the state Railroad Commission of Texas show that there is a large amount of railway construction in progress in Texas at this time, and the prospects are favorable for starting work on a number of new lines within the next few months. It is said that the failure of the legislature at its recent session to enact any law hostile to railway and other corporation interests has created a favorable impression in financial circles, and that this improved condition is reflected in the increased activity in railway construction. Several of the larger railways are making important extensions, of which a correspondent sends us the following summary:

The Atchison, Topeka & Santa Fe inaugurated a vigorous construction campaign in Texas more than two years ago and is still keeping up the work with no indications of an early cessation. In addition to the 310-mile cut-off between Coleman, Texas, and Texico, branch lines are being built which include the following: From Lometa west to Eden, about 100 miles, along the rich valleys of the San Saba river and Brady creek; from San Angelo, northwest to Sterling City, 40 miles, following the valley of the Concho river; from Plainview, south to Post City, about 100 miles, through a productive part of the western Panhandle; from a point on the Plainview-Post City line, southwest to La Mesa, 55 miles; from Plainview, east to Floydada, about 30 miles. More than one-half of the Coleman-Texico cut-off line is now finished and in operation. The Atchison, Topeka & Santa Fe interests are also back of the Port Bolivar Iron Ore Railroad which is building a 30-mile line from Longview to the iron ore fields in Cass county, in northeastern Texas.

The Kansas City, Mexico & Orient is pushing construction work on the main line and the Del Rio branch in Texas. Grading and track laying forces are at work between San Angelo and Fort Stockton, and between El Dorado and Del Rio. The company expects to finish more than 200 miles of new track during the present year.

The Texas Central, which is now owned by the Missouri, Kansas & Texas, is preparing to begin the construction of important extensions. It recently amended its charter to provide for extending the new branch, that was recently finished to Cross Plains west to Nolan, 100 miles. The main line of the Texas Central will be extended from Rotan west to Roswell, N. M., about 300 miles. The Missouri, Kansas & Texas will also obtain a southeastern outlet by connecting up its isolated line that now runs between Trinity and Colmesneil, 67 miles, in eastern Texas, with its main line and the Houston & Texas Central at Waco, and by building an extension of about 75 miles from Colmesneil southeast to Beaumont. From Trinity to Waco is about 150 miles. All of these construction plans have been definitely decided upon and the work will be started during the present year.

The Southern Pacific is preparing to carry out considerable new construction in Texas during the year. It has already made public its plans for constructing a cut-off of about 50 miles between Giddings and Stone City in the central part of the state. It is reported that it will extend the Llano branch of the Houston & Texas Central from Llano west to Menardville, about 75 miles.

The St. Louis & San Francisco recently finished work on a branch from Brady to Menardville, about 50 miles, and this line, is said will be continued south to a connection with the Southern Pacific, the Kansas City, Mexico & Orient and the National Railways of Mexico at Del Rio, about 175 miles. It will give the St. Louis & San Francisco a new outlet to Mexico and establish a new north and south line in Texas. It is reported that the work of constructing the long contemplated extension of the Fort Worth & Rio Grande division of the St. Louis & San Francisco from Brady to San Antonio, about 175 miles, will be started during the present year. The construction of the proposed extension of the Quanah, Acme & Pacific from Paducah southwest to El Paso, over 400 miles, will be resumed during the present year if the plans that are now being made do not miscarry. This road is a St. Louis & San Francisco project. The St. Louis, Brownsville & Mexico, which belongs to the same interests will be extended up the valley of the Rio Grande from Sam Fordyce to Roma, 43 miles.

Several of the smaller independent companies are now constructing extensions or have such work in view. The Crystal City & Uvalde is to be extended east from Gardendale to Beeville, more than 100 miles.

An extension of the Asherton & Gulf from Asherton northwest to Eagle Pass, about 50 miles is contemplated. The route of this extension is through a former ranch territory in south Texas that is rapidly being converted into farms.

The Paris & Mt. Pleasant is extending its line from Bogata southeast to Mt. Pleasant, about 30 miles, in northeastern Texas. This road is now finished from Paris to Bogata.

An independent construction company is being organized to build a railway between San Antonio and Brownsville, about 275 miles. Stock to the amount of $500,000 has been subscribed to the proposed company by people of San Antonio, and arrangements for constructing the proposed road are being perfected as rapidly as possible. George W. West, a wealthy ranchman of San Antonio, is at the head of the project.

The St. Louis Southwestern is constructing an extension of the line that runs from Waco to Gatesville, from the latter place to Comanche, about 75 miles. This line is already finished to Hamilton, about one-half the distance.

Many railway projects, involving the construction of several thousand miles of new track in Texas, are still on paper.

Freight in Small Packages.

The tendency of British railways to compete in facilities and quality of service is as marked in the goods as in the passenger service. Its greatest development, perhaps, has been its free cartage system, by which merchandise (with certain exceptions in coarse or so-called dead freight) is taken from the door of the shipper's warehouse or shop, moved to destination and delivered to the door of the consignee with despatch equal to that of our own companies. On five railways the aggregate number of horses in this service is close to 18,000, with a corresponding number of drays and vans, and a smaller number of automobiles and steam lurries.

The records of two important goods stations in London showed for an average day that 12 per cent. of shipments weighed 38 lbs. or less, 46 per cent. less than 100 lbs., and 88 per cent. less than 450 lbs. Only 12 per cent. averaged over 450 lbs. J. A. Droege reports a similar count taken at Camden Station, London, which indicated that 90 per cent. of the shipments weighed less than 560 lbs., and to the English statistics he has added similar figures for Providence. These with the same information for an important freight station in Boston show for one average day's business the following (excluding goods loaded or unloaded at team tracks):

Item.	Broad Street, London.	Providence.	Boston.
Consignments	985	1,622	2,325
Packages	4,427	12,831	17,085
Total weight, tons of 2,000 lbs.	123	821	833
Average weight per shipment (lbs.)	250	1,013	715
Average weight per package (lbs.)	62	128	98

From these figures it is evident that the average British shipment weighs about one-quarter or one-third that of the average shipment handled through the freight houses of Providence and Boston. The average weight per package appears to be about one-half.—*W. J. Cunningham, before New England Railroad Club.*

Telephones on the Pennsylvania Railroad.

The use of the telegraph has been entirely done away with in the way station towers of the Middle Division of the Pennsylvania Railroad, which extends from Harrisburg to Altoona, 132 miles, and only through messages between division points are now sent by telegraph. Telephone equipment is now in successful operation also over the Philadelphia Division, from Philadelphia to Harrisburg. The telephone is now being used for despatching, for messages and for block signaling.

Between Harrisburg and Philadelphia standard time is now sent out over the telephone wires. The system in use is one developed by the Western Electric Company, which has supplied the telephone equipment of these two divisions. It consists essentially of the installation at each way station of 1,000-ohm ringers, in series with the selector, and a transformer at the despatcher's office. The transformer is arranged so that the telegraph relay which receives the time from the observatory makes and breaks the primary. This causes alternating kicks to be generated in the secondary, which operates all the time bells, reproducing the taps which were formerly given by the telegraph sounder.

In block towers interrupters are used for signaling on all the radiating lines which require code ringing. These interrupters are operated by push buttons, which close the local battery and send alternating current on the lines. The Pennsylvania was the first to use this type of interrupter. By its use the operators save both time and energy in ringing on the lines.

In the Harrisburg telephone office of the Pennsylvania there is a central battery, multiple switchboard of the newest type, with four positions, and connected with the lines of the Bell Telephone Company of Pennsylvania. Extensions reach all the offices and departments in the station at Harrisburg and the residences in that city of many of the officers and employees. Trunk lines from this board go to Altoona and Philadelphia and to small switchboards located at important points both east and west on the railway's telephone system. Altoona also uses a multiple exchange equipment. The fact that over 4,000 trunk calls were recorded every 24 hours recently led to an order for the equipment of additional trunk facilities for this exchange. The telephone is used in Altoona for calling trainmen. This is a task which formerly occasioned the employment of many messenger boys. Today each engineman, conductor, etc., has a telephone in his home, connected to the central in the railway office.

Each way station is equipped with a special switchboard of the Pennsylvania Railroad Company's own design. This board contains ten combined jacks and signals, which are equipped with local contacts for code ringing. Two telephone sets are placed in each way station tower, one mounted on a special transmitter arm, the other an emergency desk stand telephone with head receiver.

Organization of a Railway Division.

Rates over all lines are now substantially the same, and the only way remaining to attract business is service, efficiency, courteous treatment, and the qualities which any business house relies upon in establishing a market. This is as it should be, and these things are largely in control of the operating department, and, therefore, I say that the operating department is a stronger soliciting arm of the service, under present conditions, than the traffic department, to which such functions are usually ascribed. Needless to say, this condition emphasizes the necessity of a complete and active spirit of co-operation and harmony between the two departments. This feeling no doubt exists on almost every railway in a sense, but it will have to be very much more intimate in the future to meet changed conditions.

In this connection, I am of the opinion that our large railway systems, at least, where there is great density of traffic, should be districted in accordance with geographical and traffic conditions. A manager should be placed in entire charge of each district. The officer should be solely and exclusively responsible for everything, of any character whatsoever, which relates to the business of his company in his territory, traffic, operation and otherwise. His staff should consist of a chief mechanical officer, a chief engineering officer, a superintendent of transportation, who should be charged with the handling of the business, or the operations of the conducting-transportation department; also, a superintendent of traffic, who should be charged with the details of all matters relating to what we now term the traffic department; a chief counsel, to advise with respect to legal matters, and such other staff officers as a suitable representation of subordinate departments may require. The manager should report to the general manager with respect to operating matters, and to the freight traffic manager with respect to traffic matters. The criticism that is at once advanced is the difficulty in finding officers to fill the position of manager who would be equally competent to administer the operating and commercial features of the business. I cannot but regard this as a detail, for the development of a system which has produced as many brilliant minds as our American railways certainly should find no unsurmountable obstacle in educating men to fill such a position as I have described. The point of fundamental importance is that there is secured the advantages of both centralization and decentralization.

After all, the higher railway officer of the future can no longer be exclusively a skillful traffic officer, a brilliant engineer, or an ingenious operating man. He will have to be all of these in a degree, though an analyst primarily. There must be a call for men of better general education, men of studious and scholarly habits of mind and judicial tendencies of thought. The day of the railway officer who follows precedent merely because it is such, and is complacent in established practice, or who dwells within the narrow confines of the department in which he was educated, is past.—*H. W. Thornton, superintendent, Pennsylvania Lines, New Castle, Pa., before the Railway Club of Pittsburgh.*

London to Paris Flight.

Prier, 25 years old, a Frenchman, and one of Blériot's assistants, left Hendon, England, six miles from London, on April 12, and made a non-stop flight to Paris. He crossed the Channel successfully in the afternoon from Dover to Calais, flying at a height of 2,000 ft. At 5:45 o'clock in the afternoon it was reported from Issy les Moulineaux, five miles from Paris, that he had landed there, making the trip of practically 290 miles without a stop.

This establishes a record distance for a non-stop flight over water and land. The best previous record for a continuous air trip was set by Olieslaegers at Reims last July when he circled the course for a total of 244.44 miles.

The machine used in the record breaking flight was the Blériot monoplane used by Leblanc in the *Matin's* eastern circuit race.

British Passenger Service.

English passenger trains are favored by confining the greater part of goods trains to night hours, thus leaving a clear line for passenger trains during the day time, when nearly all their passenger trains are run. Except in the case of the night boat trains and the through trains to Scotland, there is no such demand for night trains and sleeping-car lines as exists in this country. Here, it obviously would be impracticable either to confine passenger trains to daylight hours or freight trains to night hours, even if it were considered advisable. All through the English service it is evident that an effort is made to foster the passenger service. It brings in nearly one-half of gross revenue, and the natural result is that the passenger service there is more highly developed than here, where freight traffic is predominant.

In caring for the comfort of their passengers, English railways are quite generous, and this attitude is supplemented by a noticeable degree of courtesy and helpfulness on the part of the staff. Railway employees there are known as "company servants" and they seem to realize that their function is to serve. Among porters and men of similar grade, gratuities are expected and given, but custom has set the amount so low as not to be burdensome. At the same time any service rendered or information given is marked by a cheerfulness which is independent of the size of the tip.

The extent and quality of the British dining-car and luncheon facilities on trains and in stations seem to give little thought of returns. Nearly every important train has one or more dining cars, separate cars being provided usually for first and third-class passengers. In the first-class diner a good table d'hote dinner is served for sixty-three to seventy-five cents. One detail

of operation might be profitably copied here on certain trains. A short time before the meal is to be served, the dining-car steward goes through the train and ascertains how many passengers wish to dine. Each is assigned a time and a seat number, thus avoiding confusion and waiting in vestibule, as well as enabling the dining-car staff more accurately to anticipate the demand to be made upon their facilities and supplies.

The station facilities generally are ample and have due regard for the comfort of passengers. Some of them have lounging and writing rooms, with free stationery. As a rule, the waiting rooms and toilet rooms are scrupulously clean, but the appearance of the walls on the track side is seriously marred by advertisements which are displayed on every available inch of space. When on a moving train and straining one's eyes to catch the name of the station, it is exasperating to lose it in the medley of advertising signs, Oxo, Bovril and Colman's Mustard.—*W. J. Cunningham, before New England Railroad Club.*

Slipping Coaches.

Before leaving the discussion of British passenger service, a few words should be said about the practice of slipping coaches, that is, cutting off one or more passenger cars from the rear of the train while it is in motion, the detached portion being allowed to coast into the station, where it is stopped by the guard who remains with it, while the train continues at practically undiminished speed. The object is to serve the stations where slips are made without delaying the train by a stop. When the slipped coach or coaches are unloaded, they are taken from the main track by a switch engine or by the branch line train, if at a junction point. It will be apparent that the practice entails considerable expense and trouble in avoiding the few minutes' detention of a regular stop, but it indicates the extent of the pressure of competition in speed. Moreover, the operation is one-sided, since no one has discovered how to attach the car on the return trip without stopping the train. But the most serious objection to slipping is the added risk of accident. Two accidents have occurred, and there is always the possibility of a broken air-hose, or some other unforeseen cause, stopping the train suddenly just after the slip is made. Under such circumstances it would be difficult for the guard to control the slip coach in time to prevent collision with the train. In a country where governmental regulation in the matter of safety is so strict, one wonders why the Board of Trade countenances a practice that would not be allowed here. Something of the kind was once practiced here, but abandoned as unsafe, as has been also the flying switch with loaded passenger cars. It is said that the Board of Trade frowns on any extension of slipping, and hints that it may be abolished. Last year's time tables show that 160 coaches are slipped daily, nearly half of them on the Great Western Railway.—*W. J. Cunningham, before New England Railroad Club.*

Transporting Household Goods in England.

The British solution of the problem of transporting household goods is interesting. They have a special van, fitted with a detachable body, which may be loaded at the residence and fastened to a freight car body. The goods are, therefore, moved to destination without reloading into the car at the freight station, and at destination the detachable car body is transferred to a van frame and moved to the door of the house. The number of handlings is reduced from four to two, with a proportional reduction in risk of damage. The same principle is applied to the transportation of perishable commodities, such as fresh fish. —*W. J. Cunningham.*

American Association of Refrigeration.

The second regular annual meeting of the American Association of Refrigeration will be held at the La Salle Hotel, Chicago, on May 9 and 10, 1911. Matters of great importance to the association will be presented; among these are the annual reports of the chairmen of the various committees and commissions, detailing the activities of these bodies during the past year, as well as their recommendations for future efforts. Reports by the official delegates to the second international congress of refrigeration in Vienna, Austria, in 1910 and of the committee appointed to investigate the claims and proposals of the several cities desirous of securing the third international congress which is to convene in the United States in 1913, will be received and acted on. It will also devolve upon this meeting to determine what steps shall be taken in preparation for the third congress, to obtain national and international recognition and co-operation for it, and if possible to formulate a code of procedure for its control and management; as well as to create a complete American congress organization and subsidiary bodies. Questions pertaining to restrictive cold storage legislation both by the national and the various state legislatures will also be brought up. J. F. Nickerson, Chicago, is secretary.

Railway Special Agents.

The International Association of Railway Special Agents and Police will hold its fifteenth annual convention at Chattanooga, Tenn., April 18-21. Following are to be the principal speakers: Tuesday afternoon, A. J. Barthell (N. C. & St. L.); C. W. Burke (Southern). Wednesday afternoon, J. M. Powell (B. & O.); R. S. Mitchell (T. R. R. of St. L.); M. B. Earle (Southern); George Distler (B. & O.), and J. F. Penn (G. S. & F.). Thursday forenoon, C. C. Hodges (Southern); A. W. Worthington (D. M. & N.); T. N. Skeen (Southern); W. A. Humphrey (N. Y. C. & H. R.), and N. V. Tiernan (B. & O.). On Wednesday afternoon there will be an excursion to Lookout mountain; on Thursday afternoon an excursion to battlefields around the city, and on Friday morning an all-day excursion on the Tennessee river. The president of the association is H. H. Germain (A. T. & S. F.), and the secretary is W. C. Pannell (Southern Railway and Chesapeake Steamship Company), Baltimore, Md. The chairman of the committee of arrangements at Chattanooga is F. H. Schlapbach (C. of Ga.).

National League of Transportation Clubs.

The organization of the National League of Transportation Clubs was completed at Cincinnati, Ohio, on April 3, when the following officers were elected: President, J. V. Zartman, Indianapolis, Ind.; first vice-president, Thomas Conlon, Toledo, Ohio; second vice-president, Walter G. Norvell, Detroit, Mich.; secretary and treasurer, Carl K. Landes, Cincinnati.

New York Railroad Club.

At the meeting of the New York Railroad Club on April 21, the Hon. Chauncey M. Depew, the club's only honorary member, will make a brief address. J. P. H. Perry, of the Turner Construction Company, will read a paper on Reinforced Concrete Work for Railway Work.

Canadian Society of Civil Engineers.

At a meeting of the electrical section of the Canadian Society of Civil Engineers, held on April 13, a paper on The Operation, Construction, Application, and Characteristics of Induction Motors, was read by A. M. Gray.

American Society of Engineer Draftsmen.

A meeting of the American Society of Engineer Draftsmen will be held on April 19, in New York.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual convention, May 23-26, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911, Niagara Falls, N. Y.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; June 20-23, Kansas City, Mo.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 17, New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.
AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 9-10, 1911, Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; June 27-July 1, Atlantic City, N. J.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York; next convention, May 30-June 2, Pittsburgh, Pa.
ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911, New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May 24-26, Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; semi-annual, June 16-17, Washington, D. C.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911, Boston, Mass.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 20-21, Cape May City, N. J.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan., and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
FREIGHT CLAIM ASSOCIATION.—Waren P. Taylor, Richmond, Va.; June 21, St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C., H. & D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; May 23-26, Omaha, Neb.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911, Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; July 25-27, Chicago.
INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.
MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Block, Omaha, Neb.; second Wednesday.
RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; June 13, New York; annual, Oct. 10, Colorado Springs, Colo.
RAILWAY STOREKEEPERS' ASSOCIATION.—I. P. Murphy, Box C, Collinwood, Ohio; annual, May 22-24, 1911, Milwaukee, Wis.
RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911, St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; semi-annual, April 20, Atlanta, Ga.
SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept. Nov., Atlanta.
TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911, Baltimore, Md.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, August 29-September 1, Chicago.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.
WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago.

Traffic News.

The Morgan and the Mallory steamship lines have announced new tariffs, to go into effect May 15, showing reductions in certain freight rates from New York to Texas points, these being made necessary by the reductions made in rail rates in consequence of the recent decision of the Interstate Commerce Commission.

The Illinois Central has filed suit in the federal court for the northern district of Iowa, attacking the 2-cent fare law of that state. The petition states that the road is not able to realize more than 4½ per cent. on its investment under the law. The freight rate schedules of the state commission are also attacked as being unremunerative.

The Erie, having secured additional advantages in the movement of traffic over the Pittsburg & Lake Erie, proposes now to make a reduction in the passenger fare between Pittsburgh and Chicago, reducing the rate to $9.50, which is the same as that over the Pan Handle and the Baltimore & Ohio, but is $1 less than over the Fort Wayne route.

The Corporation Commission of Oklahoma has complained to the Interstate Commerce Commission that rates on many kinds of freight from towns in Oklahoma to Texas are too high compared with rates on similiar commodities from Texas to Oklahoma, producing a discrimination against Oklahoma wholesale merchants. Seventy railways are named as defendants.

It appears that the validation scheme agreed upon between the railways and the bankers last autumn for cotton bills of lading, to do away with the difficulties revealed by the fraudulent bills issued in Alabama, is not entirely satisfactory, and conferences are being held in New York, in which the bankers and the traffic officers of some of the southern railways are trying to devise a better plan.

In the United States District court at Pittsburgh last Tuesday the grand jury returned indictments against the Pennsylvania Railroad and the Pittsburgh & Lake Erie, charging the granting of unlawful allowances in the matter of demurrage charges. The Pittsburgh & Lake Erie is accused of holding carloads of iron for the Carnegie Steel Co. for 24 days without collecting demurrage, and against the Pennsylvania a similar charge is made in connection with shipments of ore from Lake Erie.

It is expected that the first new steel barge of the Mississippi Valley Transportation Company will arrive in St. Louis, Mo., on May 1, and that three other barges will be ready for service some time in July. An officer of the company states that it has taken out a $50,000 "block-covered" insurance policy for a year, which will cover all the freight carried. This arrangement will make it unnecessary for each cargo to be insured. The mayor of St. Louis has signed an ordinance permitting the company to build a transfer house 200 ft. x 53 ft. on the improved wharf between Market and Walnut streets, and it is said that work will soon be started on this structure.

According to figures compiled by Col. C. McD. Townsend, of the engineer corps of the United States Army in charge of the Detroit district, the total freight traffic which passed through the American and Canadian canals at Sault Ste. Marie, Mich., in 1910 reached 62,363,218 tons, an increase of 4,468,069 tons, or 8 per cent., over 1909. The total number of passengers carried in 1910 was 66,933, or an increase over 1909 of 6,985. Of the total tonnage, 40 per cent. passed through the American canal and 50 per cent. of the passengers were handled through it. The value of the freight carried through the canals is estimated at $654,010,844. The American canal was open from May 5 to December 14, and the Canadian canal from April 12 to December 15.

The Western Passenger Association has announced that stopovers will be allowed on all summer tourist tickets to Colorado and Utah points this year. The round trip rate will be $30 from Chicago; $25 from St. Louis, and $17.50 from Missouri river points, to Denver, Colorado Springs and Pueblo, and the Denver & Rio Grande is making special rates from these cities, as well as from Trinidad and Manitou, to interior points in

Colorado, Utah and New Mexico. On each Tuesday from June 20 to September 12 a lower special rate of one fare for the round trip will be made to points where the one-way rate is $6 or more, and a rate of a fare and a third to points where the one-way rate is less than $6. The stop-over privilege may be taken advantage of until October 31.

The International & Great Northern and the Missouri, Kansas & Texas have filed answers to a complaint recently made by the Louisiana railway commission in behalf of the merchants of Shreveport. The complaint alleges that certain interstate rates out of Texas have the effect of shutting merchants at Shreveport and other Louisiana points out of east Texas points. The roads say it is not fair to compare the rates from Shreveport to east Texas points with the rates between points in Texas, as the latter are enforced by the Texas railway commission, and the roads do not admit that such rates are just and fair. They also say that the rates from Shreveport to east Texas points were fixed with relation to rates on interstate business from New Orleans, Vicksburg, Memphis, St. Louis and other Mississippi river crossings.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of The American Railway Association, in presenting statistical bulletin No. 91-B, giving a summary of shortages and surpluses by groups from December 10, 1909, to March 29, 1911, says:

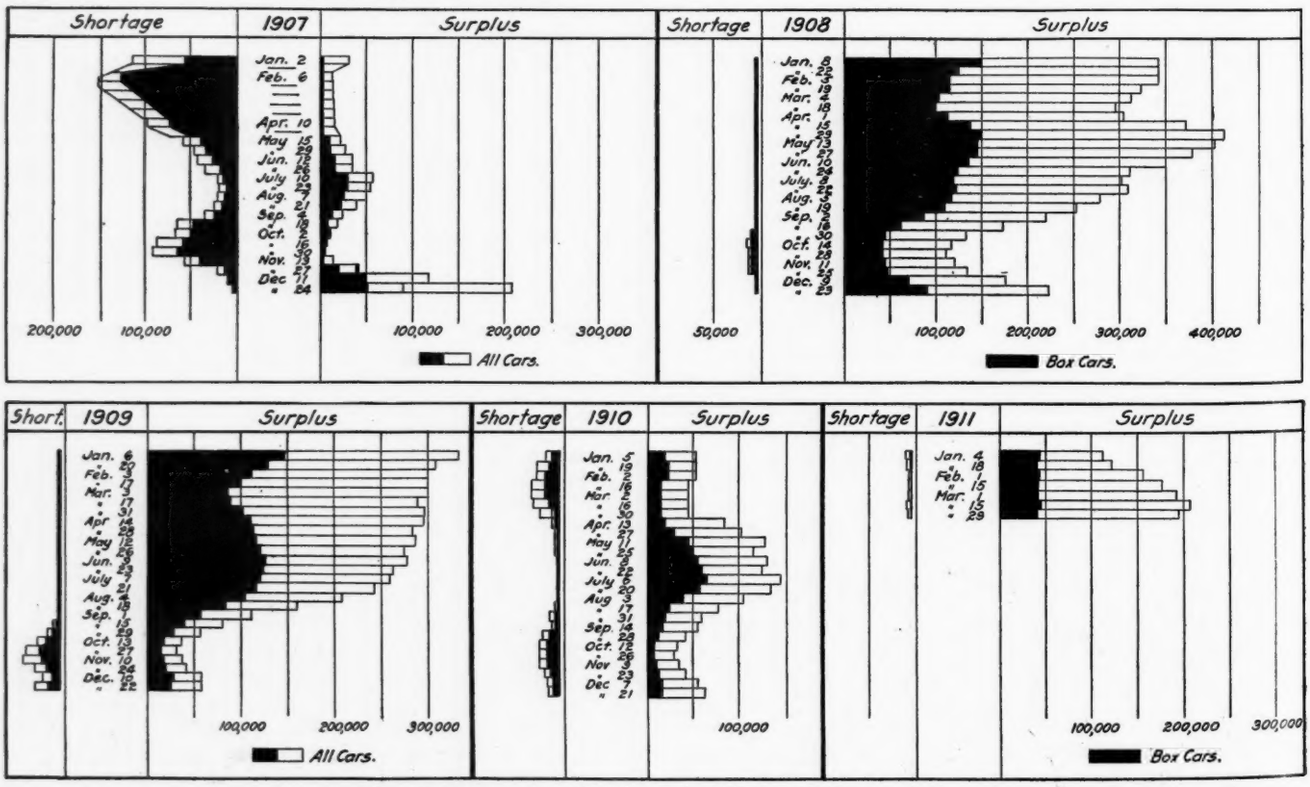
"There is a decrease of 12,310 in surplus, bringing the total down to 196,217. Of this decrease, 2,568 are box, 3,992 coal and gondola, 2,444 flat and 3,306 miscellaneous. The decrease in miscellaneous cars is principally in coke cars in group 2 (Eastern), and stock cars in group 6 (Northwestern), 8 (Middle Western), and 10 (Pacific). Territorially, the reports are somewhat varied. In the eastern and middle sections, as well as in the South, there are substantial decreases in the total surplus cars. In New England and in Canada, there are increases in the box car surplus, with partially offsetting decreases in the surplus of other classes. In the northwest, the decrease in stock cars is just about balanced by an increase in box cars, while in the West, Southwest and Pacific sections there are general decreases, although they are not so marked as in the eastern and middle sections. The reports indicate that there is practically no change in the number of shop cars since our last report, from which it follows that the decrease in surplus denotes an increase in the number of cars in service. It should also be noted that since the present increase began, the surplus of box cars has been comparatively small, indicating that the general traffic of the country is keeping up well."

The accompanying table gives surpluses and shortages by groups for the latest period covered by the report and the chart shows biweekly totals for 1907 to 1911 inclusive.

Car Surpluses and Shortages.

Date.	No. of roads.	Surpluses Box.	Surpluses Flat.	Surpluses Coal, gondola and hopper.	Surpluses Other kinds.	Surpluses Total.	Shortages Box.	Shortages Flat.	Shortages Coal, gondola and hopper.	Shortages Other kinds.	Shortages Total.
Group *1.—March 29, 1911	8	1,440	1,430	3,561	210	6,641	0	20	0	22	42
" 2.— " 29, 1911	24	2,659	246	28,416	9,487	40,808	0	3	0	0	3
" 3.— " 29, 1911	25	3,665	1,532	52,767	4,399	62,363	0	0	0	242	242
" 4.— " 29, 1911	10	1,488	107	8,784	1,409	11,788	17	302	0	0	319
" 5.— " 29, 1911	19	1,484	435	5,025	1,275	8,219	40	44	0	0	84
" 6.— " 29, 1911	22	10,827	409	4,625	4,280	20,841	39	1	11	102	153
" 7.— " 29, 1911	4	1,293	117	1,505	457	3,372	0	0	0	0	0
" 8.— " 29, 1911	15	6,226	561	3,189	3,252	13,228	10	4	0	184	198
" 9.— " 29, 1911	11	3,645	508	380	1,115	5,648	0	0	0	0	0
" 10.— " 29, 1911	19	5,637	2,283	2,643	9,097	19,660	0	2	0	9	11
" 11.— " 29, 1911	6	2,182	452	32	983	3,649	278	0	0	0	278
Total	163	40,546	8,780	110,927	35,964	196,217	384	376	11	559	1,330

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1911 Inclusive.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF FEBRUARY, 1911.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Atchison, Topeka & Santa Fe	7,536*	$4,292,890	$1,791,144	$6,722,077	$992,023	$1,146,067	$167,234	$2,118,452	$151,909	$4,575,685	$2,146,392	.....	$261,878	$1,884,514	$66,885
Atlantic Coast Line	4,494	2,034,194	731,514	2,952,543	322,946	376,122	46,459	918,939	65,851	1,730,317	1,222,226	.....	108,000	1,114,226	80,315
Baltimore & Ohio—System	4,434†	4,542,646	967,624	5,913,433	600,196	1,110,067	146,725	2,450,836	139,853	4,447,677	1,465,756	—$3,828	249,401	1,212,527	59,999
Boston & Maine	2,243	1,910,702	943,242	3,087,860	316,582	521,878	33,318	1,690,812	84,177	2,646,767	441,093	8,534	186,313	263,314	—137,133
Central R. R. Co. of New Jersey	631‡	1,285,086	321,447	1,731,383	165,053	291,264	29,617	540,683	43,454	1,070,071	661,312	—29,858	56,290	575,164	—159,782
Chesapeake & Ohio	1,947	1,860,122	344,990	2,309,107	238,345	457,136	43,590	736,041	63,469	1,538,581	770,526	—1,259	93,250	676,017	—77,134
Chicago & Alton	1,025§	641,086	298,590	1,036,995	97,536	192,217	39,176	445,981	35,043	809,953	227,042	—1,266	37,000	188,776	—35,493
Chicago & Northwestern	7,744‖	3,388,227	1,260,040	5,141,439	372,503	751,981	102,286	2,463,988	141,223	3,831,981	1,309,458	—6,346	242,000	1,061,112	—165,489
Chicago, Burlington & Quincy	9,091¶	4,014,686	1,460,704	6,158,714	465,340	1,116,266	121,551	2,201,029	196,211	4,100,397	2,058,317	—12,997	241,461	1,803,859	—189,698
Chicago, Milwaukee & Puget Sound	1,980*a*	950,273	105,084	1,090,266	120,767	137,794	35,630	488,643	17,883	800,717	289,549	—3,383	50,307	235,859	10,426
Chicago, Milwaukee & St. Paul	7,511	3,097,708	857,981	4,483,669	406,187	748,063	113,170	2,351,772	87,849	3,707,041	776,628	—3,509	226,617	546,502	—239,534
Chicago, Rock Island & Pacific	7,548*b*	3,013,577	1,320,990	4,647,692	578,855	747,416	158,614	2,071,801	143,463	3,700,149	947,543	—10,360	207,152	730,031	99,891
Chicago, St. Paul, Minneapolis & Omaha	1,744	803,529	295,498	1,177,500	65,295	144,580	19,571	519,982	32,378	781,806	395,694	—2,431	61,096	332,167	25,693
Cleveland, Cincinnati, Chic. & St. Louis	1,979	1,489,022	528,967	2,232,456	244,722	398,990	70,780	1,048,515	62,166	1,825,173	407,283	—5,223	80,000	322,060	—111,409
Delaware & Hudson Co	819*c*	1,272,158	168,817	1,482,294	116,602	242,808	17,626	625,745	42,839	1,045,619	436,675	615	44,000	392,060	—634
Delaware, Lackawanna & Western	930	1,820,026	489,456	2,477,778	158,028	441,388	59,067	860,017	65,901	1,584,401	893,377	23,467	138,028	778,817	—201,304
Erie R. R.	1,994*d*	2,659,546	572,005	3,523,329	310,957	642,734	93,705	1,294,308	75,137	2,416,841	1,106,488	—55,779	120,631	930,078	127,534
Great Northern	7,274*e*	2,464,228	766,914	3,572,001	459,981	627,508	82,478	1,424,786	96,667	2,691,420	880,581	—9,026	212,994	658,561	—122,811
Lake Shore & Michigan Southern	1,663	2,205,691	732,035	3,414,724	426,313	597,904	74,417	1,407,797	67,702	2,574,133	840,591	—7,171	135,000	698,420	—356,837
Lehigh Valley	1,433	2,274,786	259,859	2,626,363	264,378	511,467	75,942	940,725	61,222	1,853,734	772,629	—27,713	101,300	643,616	—27,449
Louisville & Nashville	4,591	2,985,000	908,840	4,151,881	714,062	766,122	91,620	1,425,242	91,756	3,088,802	1,063,079	3,435	150,000	916,514	—136,511
Michigan Central	1,803*f*	1,496,498	450,529	2,185,320	297,209	348,289	66,177	1,051,649	52,570	1,815,894	369,426	—4,887	110,000	254,539	—201,190
N. Y. Central & Hudson River	3,591	4,412,357	1,879,926	7,033,027	938,291	1,389,068	166,606	3,263,099	259,212	6,016,276	1,016,751	—19,830	391,783	605,138	—585,873
New York, New Haven & Hartford	2,041	2,050,192	1,727,761	4,182,774	325,011	580,296	27,169	1,963,949	135,938	3,032,363	1,150,411	97,425	275,000	972,836	—75,424
Norfolk & Western	1,990*g*	2,158,659	280,492	2,563,080	289,568	512,513	46,519	841,584	59,349	1,749,533	813,547	—151	115,000	698,396	—199,087
Northern Pacific	6,029*h*	2,768,276	1,000,070	4,058,531	398,065	624,603	85,435	1,674,935	84,626	2,867,664	1,190,867	5,129	202,927	993,069	46,589
Oregon Short Line	1,646*i*	824,824	285,508	1,222,334	147,532	168,504	25,364	373,385	40,052	754,837	467,497	—2,825	69,000	395,672	—265,978
Oregon-Washington R. R. & Nav. Co	1,636*j*	658,353	304,816	1,041,546	148,748	127,586	44,972	452,152	45,690	819,148	222,398	—8,854	70,135	143,409	—
Pennsylvania *Co.*	1,416	2,314,478	547,466	3,205,316	420,865	654,822	72,949	1,355,133	83,220	2,586,989	618,327	—8,392	189,734	420,201	—312,777
Pennsylvania *R. R.* Co	3,977*k*	8,095,178	2,316,218	11,186,442	1,422,742	2,341,229	155,915	4,656,388	322,932	8,899,206	2,287,236	—173,857	531,228	1,582,151	—805,515
Pere Marquette	2,334	774,227	243,902	1,103,330	153,874	205,832	36,940	643,038	32,450	1,072,134	31,196	—45,908	55,593	70,305	—255,118
Philadelphia, Baltimore & Washington	713	618,645	561,615	1,324,417	205,974	227,583	27,197	645,588	33,908	1,140,250	184,167	.....	47,396	136,771	19,115
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	1,879,820	544,305	2,746,208	297,281	621,131	70,138	1,174,169	67,001	2,229,720	516,488	—1,200	133,077	382,211	—270,000
St. Louis & San Francisco	4,732	2,091,389	829,208	3,144,639	290,138	427,339	99,556	1,214,248	100,815	2,132,096	1,012,543	.....	153,814	858,729	53,905
Southern Ry. Co	7,038	3,275,264	1,127,038	4,783,284	643,014	792,454	127,177	1,731,526	150,976	3,445,147	1,338,137	—539	178,953	1,158,645	19,320
Union Pacific	3,473*l*	2,155,941	728,817	3,249,127	294,983	515,953	89,488	998,965	103,944	2,003,334	1,245,793	—12,330	150,650	1,082,813	—374,409

EIGHT MONTHS OF FISCAL YEAR 1911.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.				
Atchison, Topeka & Santa Fe	7,536*	$39,422,813	$15,226,504	$59,371,932	$8,613,423	$9,195,441	$1,189,019	$17,368,636	$1,237,317	$37,603,836	$21,768,096	.....	$1,939,745	$19,828,351	$1,919,596
Atlantic Coast Line	4,494	14,009,789	5,109,973	20,576,013	2,679,884	3,114,687	364,235	6,728,603	546,939	13,434,348	7,141,665	.....	771,000	6,370,665	—12,103
Baltimore & Ohio—System	4,434†	45,230,565	10,506,842	59,323,126	7,036,471	11,141,032	1,352,532	22,590,939	1,233,678	43,354,652	15,968,474	$83,217	1,769,411	14,115,846	—1,964,727
Boston & Maine	2,243	17,066,592	10,669,406	29,988,209	3,848,756	3,945,077	336,978	13,982,253	717,592	22,830,656	7,157,553	35,340	1,437,880	5,755,013	—1,407,193
Central R. R. Co of New Jersey	631‡	12,006,828	3,188,580	16,024,448	1,672,689	2,486,709	252,841	4,690,245	319,810	9,422,294	6,602,154	79,174	719,833	5,961,495	—410,546
Chesapeake & Ohio	1,947	16,666,007	3,607,988	21,151,344	2,379,884	3,947,460	359,093	6,283,348	482,077	13,451,862	7,699,482	—16,692	647,373	7,035,417	—696,785
Chicago & Alton	1,025§	6,295,824	2,963,816	9,976,810	1,334,536	1,707,112	305,423	3,754,947	278,213	7,380,231	2,596,579	—14,781	288,600	2,293,198	—753,218
Chicago & Northwestern	7,744‖	33,487,453	13,176,557	51,157,835	6,749,189	6,256,190	860,018	21,188,959	1,096,272	36,150,628	15,007,207	—16,937	2,122,000	12,868,270	273,412
Chicago, Burlington & Quincy	9,091¶	40,111,555	15,759,062	61,041,879	7,661,204	9,916,332	1,068,593	19,732,365	1,490,687	39,869,181	21,172,698	—65,561	1,994,673	19,112,464	3,107,061
Chicago, Milwaukee & Puget Sound	1,980*a*	8,386,703	948,230	9,594,839	609,187	1,018,858	237,407	3,484,803	109,084	5,459,339	4,135,500	10,133	327,614	3,818,019	—
Chicago, Milwaukee & St. Paul	7,511	30,927,467	9,690,816	44,742,683	5,855,429	6,344,972	852,323	19,626,006	713,786	33,392,516	11,350,167	120,510	1,756,234	9,714,443	—1,464,038
Chicago, Rock Island & Pacific	7,548*b*	28,307,359	13,342,449	44,242,291	6,326,741	6,031,547	1,260,235	16,919,330	1,112,258	31,650,111	12,592,180	—83,662	1,774,355	10,734,163	480,150
Chicago, St. Paul, Minneapolis & Omaha	1,744	7,423,239	3,153,255	11,298,065	1,218,308	1,326,339	186,834	4,287,781	236,695	7,255,957	4,042,108	—10,537	473,611	3,557,960	502,298
Cleveland, Cincinnati, Chic. & St. Louis	1,979	13,504,261	5,465,035	20,819,074	2,722,974	3,588,561	683,037	8,879,547	464,855	16,338,974	4,480,100	—59,502	653,548	3,767,050	—1,599,938
Delaware & Hudson Co	819*c*	11,308,275	2,085,731	13,816,971	1,061,136	1,926,736	177,866	4,845,050	327,229	8,338,017	5,478,954	1,174	367,638	5,112,490	—141,052
Delaware, Lackawanna & Western	930	17,303,143	5,097,101	23,890,108	2,582,155	3,420,850	473,847	7,211,950	474,112	14,162,914	9,727,194	161,081	1,083,081	8,805,194	—1,706,850
Erie R. R.	1,994*d*	23,904,295	6,180,678	32,453,094	3,755,764	5,482,118	793,052	10,702,757	633,252	21,366,943	11,086,151	—191,204	930,834	9,964,113	456,378
Great Northern	7,274*e*	29,651,727	9,030,929	41,681,412	5,686,756	5,171,399	673,379	12,246,276	771,365	24,549,175	17,132,237	132,707	2,156,996	15,107,948	—1,181,600
Lake Shore & Michigan Southern	1,663	21,214,273	7,776,718	32,838,313	5,341,486	5,182,317	799,448	11,755,661	617,223	23,696,135	9,142,178	—40,968	1,180,182	7,921,027	—3,541,932
Lehigh Valley	1,433	20,316,465	3,077,170	24,247,129	2,478,442	4,135,409	660,747	7,971,464	516,938	15,763,000	8,484,129	—218,295	763,000	7,502,834	—763,984
Louisville & Nashville	4,591	26,514,084	7,912,111	36,605,190	5,946,564	6,367,737	766,872	11,761,617	723,063	25,565,853	11,039,337	11,077	1,126,800	9,923,614	—1,972,375
Michigan Central	1,803*f*	12,977,895	5,186,955	20,257,652	2,964,458	2,931,751	607,207	8,457,452	393,582	15,354,450	4,903,202	—31,645	915,020	3,956,537	—1,595,621
N. Y. Central & Hudson River	3,591	39,039,236	21,055,188	67,182,670	9,433,520	11,614,441	1,640,460	25,901,218	1,784,502	50,374,141	16,808,529	45,615	3,176,669	13,677,475	—3,256,743
New York, New Haven & Hartford	2,041	19,938,629	17,706,690	41,325,715	4,591,519	4,770,851	228,878	16,299,418	1,173,650	27,064,316	14,261,399	954,408	2,462,000	12,753,807	—339,595
Norfolk & Western	1,990*g*	20,232,195	2,878,747	23,988,740	2,751,049	4,525,553	395,076	7,197,252	486,103	15,355,033	8,633,707	—6,209	860,000	7,767,498	—810,618
Northern Pacific	6,029*h*	29,837,329	12,018,095	44,791,999	5,508,655	5,368,648	699,539	14,818,566	681,216	27,076,624	17,715,375	387,292	2,205,693	15,896,974	—2,045,657
Oregon Short Line	1,646*i*	9,746,025	3,342,962	13,957,434	1,784,317	1,488,984	229,247	3,393,066	347,688	7,243,302	6,714,132	—11,966	568,096	6,134,070	—1,079,771
Oregon-Washington R. R. & Nav. Co	1,636*j*	1,672,924	751,477	2,595,036	329,798	287,597	96,368	1,098,121	105,101	1,916,985	678,051	—17,070	166,652	494,329	—
Pennsylvania *Co.*	1,416	26,446,735	5,705,962	35,026,198	4,170,862	6,144,473	648,729	12,550,508	677,679	24,192,251	10,833,947	—46,320	1,432,324	9,355,303	—2,586,845
Pennsylvania *R. R.* Co	3,977*k*	75,973,247	22,478,915	105,454,699	13,275,222	20,034,108	1,535,509	39,073,809	2,685,127	76,603,775	28,850,924	—856,990	3,568,531	24,425,403	—6,313,248
Pere Marquette	2,334	7,216,473	2,754,375	10,816,265	1,424,987	1,667,976	316,224	4,891,912	266,234	8,567,333	2,248,932	—51,270	468,287	1,729,375	—1,032,437
Philadelphia, Baltimore & Washington	713	6,331,204	5,130,491	12,724,998	1,935,458	2,063,790	233,044	5,328,538	282,817	9,843,647	2,881,351	.....	388,233	2,493,118	—111,503
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	18,235,968	5,560,487	26,731,625	3,357,176	4,992,894	600,813	10,136,614	526,546	19,614,043	7,117,582	—6,933	1,097,527	6,013,122	—1,792,350
St. Louis & San Francisco	4,732	18,386,688	7,783,667	28,122,849	3,799,358	3,827,226	694,571	9,917,333	816,614	19,055,102	9,067,747	.....	1,147,616	7,920,131	714,357
Southern Ry. Co	7,038	26,671,006	11,016,472	40,752,081	5,090,200	6,566,877	1,035,961	13,644,080	1,180,801	27,517,919	13,234,162	9,899	1,455,902	11,788,159	395,787
Union Pacific	3,473*l*	25,319,748	7,644,496	35,916,307	3,422,121	4,129,838	813,359	9,233,728	862,213	18,461,259	17,455,048	—40,151	1,243,695	16,171,202	—1,047,820

Mileage operated on February 28, 1910—* 7,459 miles; † 4,460 miles; ‡ 668 miles; § 998 miles; ‖ 7,638 miles; ¶ 9,021 miles; *a* 1,463 miles; *b* 7,393 miles; *c* 843 miles; *d* 1,961 miles; *e* 7,129 miles; *f* 1,746 miles; *g* 1,942 miles; *h* 5,849 miles; *i* 1,509 miles; *k* 3,947 miles; *l* 3,411 miles.

j Began operations on December 24, 1910; — indicates Deficits, Losses and Decreases.

Dallas (Tex.) Traffic Club.

The Dallas Traffic Club was organized on April 8, when the following officers were elected: President, James E. Ludlow; first vice-president, S. G. Reed; second vice-president, C. W. Hobson; third vice-president, W. G. Crush; secretary, G. S. Maxwell. J. L. West, general freight agent of the Missouri, Kansas & Texas, made an address at the banquet which was held in connection with the organization of the club.

Copper from Alaska.

The first trainload of copper ore from the Bonanza Mine, in the high mountainous interior of Alaska, left Kennecott April 6, at 8 a. m., and arrived April 8 at Cordova, the seaport, over the new Copper River & Northwestern Railway. The distance is 197 miles. It was also the first copper shipment of any magnitude from any point in Alaska. It consisted of 1,100 tons, run of the mine, and was sacked; the crude ore being shipped direct to the Tacoma smelter without going through the mill. The entire shipment ran over 70 per cent., and the value of the shipment was considerably over $200,000. Similar shipments will be made each week from Cordova to Tacoma, so that the product of this new Alaskan property is expected to have a direct effect on the copper market.

A Comparison of English and American Railway Statistics.

The accompanying table compiled by the Bureau of Railway Economics gives a comparison of certain English and American railway statistics for 1908. The United Kingdom is compared in this table with Group II of the Interstate Commerce Commission groups, covering approximately the states of New York, Pennsylvania, New Jersey, Delaware and Maryland, as being the region of densest traffic in the United States:

Subject for Comparison.	United Kingdom. 1908.	United States, 1908. (Group II)
Area in square miles	121,400	107,873
Population per square mile (estimated for 1909)	371	182
Miles of single track operated (miles of line)	23,205	23,696
Miles of additional track	30,464	24,992
Per cent. additional tracks are of all tracks	56.8	51.3
Operating revenues per mile of line	$23,185*a*	$22,915
Per cent. of total operating revenues: (*b*)		
Revenue from passengers	38.55	22.42
Other passenger service train revenue	8.18	4.91
Freight revenue	53.27	71.17
Other operating revenue	.....	1.50
Maintenance of way and structures	10.02	12.27
Transportation, traffic and equipment	44.97	55.41
Taxes	4.73	2.92*c*
All other operating expenses	5.67	2.07
Total operating expenses and taxes (*d*)	65.39	72.67
Expenditure per mile for maint. of way and structures	$2,321	$2,813
Net operating revenue per mile of line	$8,025*e*	$6,263*f*

Subject for Comparison.	United Kingdom. 1908.	United States, 1908. (Group II)
Capitalization per mile of line (*g*)	$274,842	$142,404
Per cent. net operating revenue is of capitalization	2.92	4.40
Operating revenues per train mile:		
Passenger service train revenue	$0.95	$1.27
Freight revenue	1.81	2.98
Total	1.27	2.24
Train miles per mile of line:		
Passenger	11,398	4,743
Freight	6,775	5,331
Mixed	65	137
Total	18,237*h*	10,218*i*
Number of locomotives per 100 miles of line	98	56*k*
Number of cars per 100 miles of line	3,619	2,327*k*
Number of passengers carried per mile of line	55,079	13,172
Number of tons hauled per mile of line	21,184	19,428*m*
Accidents:		
Number of employees killed per 1,000 miles of line	18.2	39.9
Number of employees injured per 1,000 miles of line	1,035	963

a Revenue from traffic.
b Rail operations in Group II; revenue from traffic in United Kingdom.
c Operating and leased roads.
d Rail operations including taxes in Group II; working expenditure including taxes but excluding steamboats, docks, etc., in United Kingdom.
e Receipts from traffic less working expenditure, including taxes but excluding steamboats, docks, etc.
f Rail operations less operating expenses and taxes.
g Gross capitalization in both countries.
h Report does not mention non-revenue train mileage.
i Revenue train mileage including special.
k Excluding equipment of switching and terminal companies.
m Freight earning revenue.

Hearing Regarding Fourth Section.

The hearing in Washington, D. C., before the Interstate Commerce Commission regarding the meaning and application of the amended long and short haul clause was finished last week. J. G. Woodworth, traffic manager of the Northern Pacific, said that he believed the blanketing of freight rates eastbound probably was the best way to end the demoralization existing until 1898, but he believed similar blanketing of rates westbound would not be a good thing. He expressed the opinion that a reasonable first-class rate from New York to Seattle, Wash., if water competition were absent, would be $3.70. It is not the policy of the Northern Pacific to force commodities to travel past the point of consumption so as to get a back haul.

W. R. Wheeler, manager of the Traffic Bureau of the Merchants' Exchange of San Francisco, stated at length his theory of rate-making. He said that the only logical way to make a rate to the interior West is to make it a combination of the rate by sea and the rate from the coast terminal back to the interior point, provided the back haul rate is reasonable in itself. He said that blanketing the rates from Chicago to the Atlantic seaboard is illogical, and gives Chicago an unnatural advantage. He had consulted traffic men as to the effect on ocean rates of the opening of the Panama canal and they tell him a rate of $4 or $5 a ton will be made, plus whatever canal toll, if any, the government may impose. This would be less than one-half the present rate on most westbound cargoes. Mr. Wheeler said that San Francisco is the natural gateway for California and Nevada, and that the railways, by making terminal rates to numerous interior points in California, refuse to recognize this. The interior point is entitled to the combination of commodity rates to the nearest seaport plus the local, or back haul, charge, if that combination be lower than the direct rate established as reasonable, and he declared it unreasonable to compel the railways to equalize geographical disadvantages. The San Francisco shippers, he said, must be allowed the advantage of ocean competition, or there will be no such competition. The increase in rates made by railways about two years ago were "disastrous" to them. They "stirred up" the people on the coast, and one result was the establishment of the Bates & Cheseborough steamship line, which has become a controlling factor. The position taken by Mr. Wheeler was also taken by Seth Mann, attorney of the San Francisco Merchants' Exchange. He contended that either Sacramento, Stockton and other California cities are not entitled to the terminal rates which they now enjoy, or other places in California on rivers are entitled to them. George Bradley, speaking for the business men of Sacramento and Stockton, said that San Francisco's commercial greediness caused its spokesmen to overlook some rather pertinent facts bearing on the situation. One was that Sacramento was a distributing point before San Francisco, the ships originally bringing goods for the mining camps to Sacramento, and not to San Francisco.

The meaning of the amended fourth section was discussed by a number of persons, including C. E. Durborow (Southern Pacific), N. H. Loomis (Union Pacific), E. C. Lindley (Great Northern), H. C. Barlow (Chicago Association of Commerce), H. F. Bartine (Nevada Railway Commission), W. W. Cotton (Oregon-Washington Railroad & Navigation Company), and Charles Donnelly (Northern Pacific).

Mr. Bartine admitted that there is some water competition, but contended that it is not controlling. He argued that the amended fourth section requires the Interstate Commerce Commission to compel the railways to observe the long and short haul rule with regard to every commodity and permits their exemption from its operation only on a showing that a particular commodity is being carried by steamships at lower rates than the railways are charging, and that unless the railways are permitted to disregard the long and short haul rule in hauling these commodities, they will be driven out of business. Mr. Cotton flouted the suggestion that any railway is deliberately discriminating against any particular community. He said that they should not be penalized for engaging in coast to coast business, which would be the case if they were compelled to make their terminal rates apply to interior points. He contended that competition between rail and water carriers is honest, healthy and sane, but not cut-throat.

Suez Canal.

The number of vessels passing through the Suez canal in the year 1910 was 4,533, having a gross tonnage of over 23 millions. The canal dues, which are at the rate of 7.75 francs a ton, amounted to over 25 million dollars. The canal was opened in 1869, and during the first year the number of vessels passing through was 486. Electric lights were put up, to permit the passage of vessels at night, in 1887. The canal is 87 nautical miles long, and vessels which go through in the night spend an average of 16 hours 42 minutes in the canal. Of the 23 millions of tons passing through in 1910, over 14 millions represent British vessels.

Crop Conditions.

The United States department of agriculture estimates that the average condition of winter wheat on April 1, was 83.3 per cent. of a normal, against 80.8 on April 1, 1910; 82.2 on April 1, 1909, and 86.9 the average condition for the past ten years on April 1. There was an advance in condition from December 1, 1910, to April 1, 1911, of 0.8 points as compared with an average decline in the past ten years of 4.4 points between these dates.

The average condition of rye on April 1, was 89.3 per cent. of a normal, against 92.3 on April 1, 1910; 87.2 on April 1, 1909, and 90.2 the average condition for the past ten years on April 1.

Comparisons for winter wheat and rye states follow:

States.	Winter Wheat. Condition April 1. 1911.	1910.	10-yr. av.	Condition Dec. 1, 1910.	Rye. Condition April 1. 1911.	1910.	10-yr. av.	Condition Dec. 1, 1910.
Kansas	75	64	87	73	75	70	89	74
Nebraska	86	70	90	90	86	84	92	88
Indiana	86	84	84	84	92	90	90	92
Illinois	82	84	88	82	90	93	93	91
Missouri	91	69	88	83	92	80	91	85
Pennsylvania	87	89	88	90	90	91	90	91
Ohio	84	85	82	91	86	87	86	93
Washington	97	94	90	96	95	98	94	98
Oklahoma	55	87	85	58	65	87	87	76
Michigan	88	84	83	94	90	91	88	95
California	88	98	93	90	96	96	93	99
Oregon	97	93	92	98	98	97	97	97
Maryland	81	92	88	80	84	90	91	82
Idaho	98	97	96	95	98	99	97	94
Virginia	85	90	86	81	88	91	87	83
New York	85	94	90	96	88	96	91	96
Tennessee	86	84	86	80	88	86	87	87
Kentucky	89	84	84	83	91	88	86	89
Montana	96	97	..	97	93	97	96	98
N. Carolina	89	90	89	83	88	90	89	84
Texas	85	89	78	71	95	82	76	80
W. Virginia	85	88	84	83	87	90	87	82
S. Carolina	87	88	88	87	88	89	88	92
Utah	95	94	..	87	98	99	100	94
Iowa	89	75	90	92	92	92	95	93
Colorado	92	96	..	90	82	93	89	88
Georgia	90	86	88	88	90	88	90	90
New Jersey	89	91	89	91	91	93	91	93
Arkansas	87	90	87	82	88	87	88	80
Delaware	84	96	88	75	85	94	89	86
Wisconsin	85	95	90	96	91	98	94	98
Alabama	91	85	88	89	88	90	89	91
Wyoming	95	97	..	100	98	97	95	100
Mississippi	86	90	88	92	..	..	..	..
Minnesota	..	..	..	..	85	96	90	88
United States	83.3	80.8	86.9	82.5	89.3	92.3	90.2	92.6

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until October 14 numerous tariffs presented by express companies naming charges for the transportation of liquors.

The trunk lines have notified the commission that they intend to claim the right to continue in force their present tariffs for passengers and baggage to and from Chicago, regardless of the requirements of the long and short haul rule of the fourth section of the Interstate Commerce Law. The roads claim that it is out of the question to prepare a list of all the instances in which present rates fail to conform to this rule. They say that only by disregard of the long and short haul rule can they make up for the losses forced upon them on interstate rates by the laws of the states through which they run.

Rules to Avoid Damage Claims.

Millinery Jobbers' Association v. American Express Co. et al. Opinion by Commissioner Harlan.

As damage claims increase the expense of carriage and thus effect the rates, it is reasonable and to the interest of the general shipping public as well as of the carriers to discourage shipping methods and the use of shipping cases that are lacking in safety. On these grounds and on the facts disclosed by the record, the classification rule of the defendants applying minimum weights on shipments of merchandise, and more particularly millinery, packed in ordinary pasteboard or strawboard boxes, is not unreasonable; nor is the rule unreasonable that provides for the refusal of such shipments when not crated.

The classification rule of the defendants applying minimum weights on shipments in corrugated paper or pulp cartons of certain sizes, when uncrated, instead of assessing the charges on the basis of their actual weights, found unreasonable. (20 I. C. C. 498.)

Rates to Texas Common Points Upheld.

Railroad Commission of Texas v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Harlan.

On March 15, 1903, all the class rates and most of the commodity rates from St. Louis and Kansas City to Texas common points were advanced by the carriers interested in that traffic, the extensive territory taking rates based on St. Louis being also necessarily affected by the increase. This readjustment of rates on a higher level was the occasion of a thorough investigation instituted by the Commission for the purpose of inquiring into the question of their reasonableness. The report was announced on August 16, 1905, under the title *In the Matter of Class and Commodity Rates from St. Louis to Texas Common Points*, 11 I. C. C. Rep., 238; and the view expressed was that while the advances on the whole seemed to be without justification, this did not appear with sufficient certainty to warrant the commission in ordering the old rates to be restored. On the same day on which the increased rates went into effect the Railroad Commission of Texas filed this formal complaint attacking them as unjust, unreasonable, and discriminatory.

In the tariff of August 10, 1908, there are about 110 special commodity items naming rates to Texas common points from the Mississippi river and territory beyond. It appears that advances were made in about 54 of these items, while 44 carried reductions, and in 12 items the commodity rates were unchanged. The extent of the traffic affected by the advanced rates does not clearly appear. Counsel for the Texas lines seem to think that they affect about 50 per cent. of Texas interstate traffic. Counsel for the complainant on the other hand assert very positively that the traffic moving under the increased rates did not exceed 10 per cent. of the total tonnage of any one of the railways involved. It is said in the petition that the advanced rates will add $2,600,000 a year to the revenues of the carriers, but no testimony on the point was offered by the complainant. The railways are of the opinion that the total increase in the revenues would range in the aggregate anywhere from $500,000 to about $1,250,000.

Of the four trunk lines that are defendants, namely, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific and the St. Louis & San Francisco, it is believed that the M. K. & T., from a traffic standpoint, is probably the most typical and representative. The defendants claim that the advanced rates will not afford them more than a fair return on the value of their property, while the complainants try to prove that under the lower rates previously in effect, the companies were earning a sufficient return on their own investment. The commission attempts to get a per mile value for the M. K. & T., by taking the aggregate market price of the securities of the company one year after its reorganization in 1891 and adding to it the sums spent since that time, for additions and betterments and additional equipment, and arrives at a total apparent investment per mile of road of $38,993, and on this valuation the net return during the year 1910 applicable to interest and dividends with the increased rates in effect was but 5.41 per cent.

As heretofore stated, the issue made on the pleadings and enlarged upon throughout the record both in the exhibits offered and in the testimony given by various witnesses, expert and otherwise, and again emphasized on the oral argument and on the briefs, was that the returns enjoyed by the defendants on their respective investments were as large as, and in some cases larger than, they should be, and therefore that no increase in rates for the purpose of securing additional revenues was justified. But on their brief and on the oral argument the com-

plainant also insisted that the increased rates are unreasonable irrespective of the question of the adequacy or inadequacy of the returns to the defendants on their several properties. It was also contended by the complainant that the advances were made without regard to any consistent or logical system or plan; that those who pay advanced rates were selected to bear the burden of the desired increase only because the carriers were able to agree to advance those particular rates, thus stifling all competition among them with respect to such rates; that those who now pay reduced rates enjoy that benefit under the new schedule only because the defendants were able to agree to reduce those particular rates; and that other rates remained unchanged only because they are controlled by the orders of this commission or because for some other reasons the carriers could not agree either to raise or to reduce them. All this is urged as showing the unreasonableness of the advanced rates. It is also contended that the advances in rates, made for the purpose of securing additional revenue and thus yielding a better return on the investment, should have been spread more or less over the whole traffic instead of being laid upon a part of the traffic. It will be remembered, as heretofore indicated, that the complainant minimizes the extent of the tonnage of the defendants that was affected by the increased rates, while the defendants endeavor to show that not less than 50 per cent. of the total tonnage into Texas was affected by the new schedules.

It is of course manifest that when additional revenues are desired and rates are to be increased for that purpose a horizontal advance in all rates on a fixed percentage, instead of yielding additional revenue, would not improbably result in a reduced revenue. Competitive and commercial conditions have so important a relation to the movement of particular kinds of traffic as to make such a readjustment of a rate schedule inadvisable if not altogether impossible. While many advances were made, many reduced rates were also published in the new schedules, other rates being left unchanged; and we think the testimony fairly shows that the defendants at least thought there was a reason for their action or inaction in each case. It is doubtless true that certain rates were increased for no other reason than that the particular traffic to which they applied could bear a higher rate; and that many reductions were made in the expectation of inducing a heavier movement of particular commodities and in that way of increasing the revenues; and that no change was made in other rates because it was thought that they were already on the right basis and that a change either by way of reduction or increase would not be effective. This explanation was made by several witnesses who participated in preparing the new tariffs, and we do not see how experienced railway men could or would otherwise approach the question of a general rate revision for increased revenues.

Certainly in the absence of testimony showing that specific mistakes or blunders were made in the revision, we see no grounds in that course of action for a general condemnation of the whole rate structure now before us.

During the argument none of the important questions discussed in the eastern and western rate advance cases now pending was considered. The amendment to the act casting upon carriers the burden of justifying increases in rates was enacted long after the rates here in question were put in effect, and the construction and interpretation of that provision, argued so earnestly in those cases, may not therefore be appropriately discussed here. Nor did any question arise here, as in those cases, of the right of carriers so to adjust their rates as to yield earnings sufficient to enable them to put back into the property some fixed proportion of the amount paid out in dividends. That question is therefore not considered. Apparently that is a policy that many of the carriers defendant in this proceeding are not in a position to consider from a practical point of view.

Nor was it contended here that the general rate schedules should be so adjusted as to give the carrier a sufficient surplus of net income to be the basis of credit in the money markets or an assurance to investors of the security of the funds advanced or to be advanced by them for additional construction. The only matter among all the questions of that nature argued in the eastern and western cases that was brought to our attention in this proceeding was the contention of the complainant that when real estate has been acquired for right of way and for terminals and has been put to that use by a common carrier, it loses to some extent the ordinary attributes of real property and is not to be regarded as increasing in value with the abutting and adjoining property, but remains an earning asset only on the basis of its original cost or on the basis of its value at the time it was actually subjected to the public use. That, it seems, has been the declared policy of the Railroad Commission of Texas. In the first valuations made by it in 1894 the market value of the real estate was ascertained and used; but one of its members when testifying before us in this case said that it was neither the practice nor the policy of his commission, in any subsequent valuation of a road valued by it in 1894, to make any allowance for the increased value of the real estate comprising its right of way and terminals, but to make allowances only for the additions and betterments added to the property since the original valuation. And it was contended here that in considering the value of the respective properties used in the public service by these defendants no allowances should be made for the increment in the value of their real estate. The question is perhaps of as great importance as any other pending problem of public interest, but as we have not found it necessary in disposing of the issues in this case to rest conclusions on either view of the matter, we need not attempt any discussion of it in this report.

We have reached the conclusion, all things being considered, that no grounds have been shown or have been disclosed by our own investigations for making any substantial disturbance in the rate schedules of the defendants that went into effect on August 10, 1908. We do not find that they have so increased the revenues of the defendants as to make them extortionate or to yield earnings that are unduly large, as alleged. We shall not therefore interfere with the commodity rates that were made effective by the defendants on August 10, 1908, it being understood, of course, that any particular rate or set of rates in those schedules is still open to attack before this commission on the grounds that are ordinarily assigned in challenging the reasonableness of a rate or rates in effect. But all things considered and in view of the signs now observable of a recovery from the financial disturbances occurring at the close of 1907 and of a return to normal commercial conditions, we should regard the continued maintenance of the present class rates as discriminatory and as imposing an unreasonable burden upon the commerce that moves from St. Louis and elsewhere to Texas common points. In our judgment the present rate of $1.47 on articles of the first class may be retained as a maximum; the present second class rate of $1.29 for the future should not exceed $1.25; but the prior rates on all the lower classes should now be restored. We accordingly find that the present scale of class rates is unreasonable and discriminatory and that reasonable class rates for the future ought not to exceed the following:

Class	1	2	3	4	5	A	B	C	D	E
Rate	147	125	104	96	75	79	70	58	46	39

(20 I. C. C. 463).

STATE COMMISSIONS.

The Minnesota Railway Commission has again postponed its investigation into the reasonableness of express rates. It is announced that the hearing will be held at St. Paul on April 27, instead of April 13.

George McCaughan, chief rate clerk for the Iowa Railway Commission, has been elected secretary of the commission, succeeding Dwight N. Lewis, who has been appointed a special examiner of the Interstate Commerce Commission.

The New York Public Service Commission, Second district, has postponed until May 1 the time at which its order directing the New York Central & Hudson River to use oil burning locomotives exclusively in the Adirondacks is to go into effect.

The New York Public Service Commission, Second district, has appointed George J. Mack of Syracuse inspector of locomotive boilers at a salary of $3,000 per year. Mr. Mack has been employed by the commission since July, 1908, as mechanical engineer, acting as assistant to G. P. Robinson, who has been appointed a federal boiler inspector. Mr. Mack is a graduate of Syracuse University, and has had practical experience, as well as technical instruction in boiler work. On the promotion examination held by the Civil Service Commission for the place, his standing was 95 per cent.

COURT NEWS.

The Pennsylvania eight-hour law of 1897, applicable to workmen engaged on public works, has been declared unconstitutional by the Supreme Court of that state.

The Supreme Court of New Jersey on April 8 issued an opinion sustaining the constitutionality of the employers' liability law of that state, passed in 1909, in which the fellow-servant doctrine is abolished. The court sustains the action of the legislature in abolishing this rule and also in enacting a rule which is applicable to railways and not to other employers. The more drastic employers' liability law which has been passed this year, will go into effect July 1 next.

A decision which has been rendered by Judge Wellborn, of the United States District Court at Los Angeles, Cal., in the case of the government against the Atchison, Topeka & Santa Fe, in which the road was accused of having given rebates to the Grand Canyon Line and the Cement Company of Nelson, Ariz., has the effect of acquitting the road. The court denied the right of the government to introduce railway tariff sheets which T. J. Norton, general attorney of the road, objected to on the ground that the rate given in the tariff was essentially different from that cited in the indictment.

The United States Circuit Court of Appeals at St. Paul, Minn., in an opinion by Judge Sanborn has decided the case which former Governor Haskell of Oklahoma and others of that state appealed from the order of the circuit court of the eastern district of Oklahoma enjoining the state from interfering with pipe lines. The opinion holds that the Oklahoma law "discriminates against and prevents interstate commerce in natural gas in Oklahoma by preventing use of pipe lines across the highways of the state to transport such gas out of the state, violates the constitution of the United States, and is void."

Decision in the Minnesota Rate Case.

Judge Walter H. Sanborn in the United States Circuit Court at St. Paul, Minn., on April 8 handed down an opinion holding unconstitutional the reductions in state passenger and class and commodity freight rates which were required by orders of the Minnesota commission and laws passed by the state legislature in 1907. The decision prohibits the enforcement of reduced rates after June 1, 1911. He holds in his opinion:

"1. The acts of the legislature of Minnesota of April 4, 1907, chapter 97, reducing passenger fares within the state about 33 1-3 per cent. and of April 18, 1907, chapter 232, reducing commodity rates within the state about 7.37 per cent., and the orders of its railway and warehouse commission of September 6, 1906, reducing general merchandise rates within the state from 20 to 25 per cent. and of May 3, 1907, reducing in-rates within the state to distributing points by their natural and necessary effect substantially burden and directly regulate interstate commerce, create undue and unjust discriminations between localities in Minnesota and those in adjoining states, violate the commercial clause of the constitution, article 1, section 8, and are void.

"2. These acts and orders which prescribe maximum fares and rates, that bring from their respective Minnesota intrastate business to the Northern Pacific company an annual net income of only 2.909 per cent., to the Great Northern company an annual net income of only 3.359 per cent., and to the Minneapolis & St. Louis company an annual net income of only 2.476 per cent. of the respective values of their Minnesota properties devoted to these businesses, prohibit a fair return upon these values, take the properties of the companies without just compensation, violate the fourteenth amendment to the constitution, and are void.

"3. The power to regulate commerce among the states was granted by the people to the nation in the constitution, is exclusive, may be exercised to its utmost extent by the use of all means requisite to its complete exercise, and no state, by virtue of its police power or any other power, may restrict this grant or the plenary exercise of this power, for these inhere in the supreme law of the land and are paramount to the powers of the states."

"4. The fares and rates of transportation in interstate commerce are national in character, susceptible of uniform regulation and so far as the nation has not regulated them are free from regulation by virtue of the commercial clause of the constitution.

"5. The nation may regulate interstate fares and rates and all interstate commerce.

"To the extent necessary completely and effectually to protect the freedom of and to regulate interstate commerce, but no farther, it may by its congress and its courts regulate intrastate commerce.

"To the extent that it does not substantially burden or regulate interstate commerce a state may regulate intrastate commerce and the fares and rates therein within its borders, but no farther. It may enforce regulations of intrastate commerce and its fares and rates which only incidentally or remotely affect interstate commerce. But state laws, orders and regulations concerning intrastate commerce, or the fares or rates therein, which substantially burden or regulate interstate commerce or the fares or rates therein, are beyond the powers of the state, unconstitutional and void.

"And where the attempted exercise of the power of a state to regulate intrastate commerce, or the attempted exercise of any of its other powers, impinges upon or conflicts with the constitutional power of the nation to protect the freedom of, and to regulate interstate commerce and the fares and rates therein, the latter must prevail because 'that which is not supreme must yield to that which is supreme.'

"6. Neither the effect nor the terms nor the purpose of state regulations determine whether they substantially burden or only incidentally or remotely affect interstate commerce.

"And this is a judicial question which each court must decide on its own responsibility on the special facts of the case before it and in the decision of which it 'must obey the constitution rather than the law-making department of the government.

"7. The nation has the power to forbid, and by the act to regulate commerce, 24, statute 379, it has prohibited undue discriminations between localities in different states wrought by unreasonable differences between intrastate and legal interstate rates caused by the reduction of the former by the acts and orders of the officers of a state.

"8. The facts considered and held:

"The unavoidable effect of the general and sweeping reductions of intrastate fares and rates in Minnesota made by the acts and orders considered, was and is substantially to burden, directly to regulate and to discriminate against the interstate commerce of the defendant companies, and to create undue and unjust discriminations between localities in Minnesota and those in other states in violation of the commercial clause of the constitution.

"9. The just compensation secured by the fourteenth amendment entitles the defendant railway companies to a fair return upon the reasonable value of their property in Minnesota devoted to the public for transportation. Such a return is just to the public as well as to the carriers.

"10. Under the evidence in these cases the cost of reproduction of the Minnesota properties of the defendant companies devoted to the public use of transportation is more evidence of their values than the market value of their stocks and bonds, or the original cost of their acquisition and construction.

"11. Rate making looks to the future and is a legislative function.

"Rate judging, determining whether or not rates made are confiscatory, is a judicial function.

"There is a presumption in the first instance that legislatures and commissions make reasonable and just rates and clear proof is requisite to overcome it.

"But when, after fares and rates have been tried by actual use for months, after plenary proof of their effect and other facts determinative of the issue confiscation *vel non* has been made before a master learned in the law, who finds the facts, the legal or judicial presumption that his findings are just and right, while not conclusive, is superior to the original presumption that the rates were just and reasonable.

"12. Interest on the cost of reproduction of railway property at 4 per cent. per annum during one-half the time requisite to acquire and construct it is a necessary expense of reproduction and may be lawfully allowed as such.

"13. Apportionment on the basis of revenue is the most reasonable and equitable method of assigning the value of railway property in a state used for transportation to the various classes of its business in order to determine the reasonableness of fares and rates.

"14. A net income of 7 per cent. per annum upon the value of railway property in Minnesota devoted to the public use of transportation is not more than the fair return to which a railway company is entitled under the fourteenth amendment to the constitution."

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Elija Robinson, assistant to the general solicitor of the Missouri Pacific, with office at Kansas City, Mo., has resigned.

E. F. Osborn, assistant secretary of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati, Ohio, has resigned, after a service of 40 years with that road.

Carl R. Gray, who has been elected president of the Spokane, Portland & Seattle, the Oregon Trunk Railway, the Astoria & Columbia River, the Oregon Electric Railway, the Pacific & Eastern and the United Railways Company, with office at Portland, Ore., as was previously announced in these columns, was born September 28, 1867. He was educated at the Arkansas Industrial University, and began railway work in 1882, as a telegraph operator for the St. Louis & San Francisco. Four years later he was transferred to the traffic department as a clerk, and in April, 1887, was appointed commercial agent. For seven years from July, 1890, he was division freight agent, and he was then transferred to the operating department as division superintendent. He was promoted to superintendent of transportation in October, 1900, and early in 1904 was appointed general manager. In November of the same year he was appointed second vice-president and general manager, and was elected vice-president in 1906, which office he resigned to become president of the Hill lines as above.

C. R. Gray.

W. C. Nixon, whose election as vice-president in charge of maintenance and operation of the St. Louis & San Francisco, the St. Louis, Brownsville & Mexico and other Frisco lines, with office at St. Louis, Mo., has been announced in these columns, was born February 15, 1861, at Earlville, Ill. He was educated in the public schools at Washington, Ill., and began railway work as a bridge carpenter for the Burlington & Missouri River of Nebraska in February, 1879. Later in the same year he went with the Atchison, Topeka & Santa Fe, with which road he was consecutively, night watchman and then clerk and baggage man at Emporia Junction, Kan.; clerk, cashier and chief clerk at Albuquerque, N. Mex.; agent at Las Cruces, N. Mex.; agent at Albuquerque; chief clerk to superintendent at San Marcial, N. Mex.; trainmaster on the Southern Kansas division at Wellington, Kan.; superintendent of terminals at Kansas City, Mo. He was appointed superintendent of the Chicago division at Chillicothe, Ill., in November, 1890, and early in the next year became superintendent of terminals at Chicago. He was made general agent in the freight department at Chicago in August, 1896, and was superintendent of the Chicago division for three years from January, 1897. From January, 1900, to August, 1906, he was consecutively, general superintendent, general manager, second vice-president and president of the Gulf, Colorado & Santa Fe at Galveston, Texas. In the latter year he went with the St. Louis & San Francisco, being elected vice-president and general manager at St. Louis, from which office he is now promoted.

W. C. Nixon.

W. B. Wilkins, district auditor of the Union Pacific at Omaha, Neb., has been appointed auditor of disbursements, succeeding R. Anderson, who has been retired under the pension rules of the company.

Operating Officers.

L. A. Daffan has been appointed superintendent of the Texas State Railroad, with office at Palestine, Texas, succeeding T. T. Clark, resigned.

P. G. Williams, trainmaster of the Chicago, Milwaukee & Gary at Rockford, Ill., has been appointed trainmaster of the Pacific & Idaho Northern, with office at Weiser, Idaho.

J. B. Chandler has been appointed superintendent of car service of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn., and the position of car service agent has been abolished.

C. E. Urbahns, assistant superintendent of the Minneapolis, St. Paul & Sault Ste. Marie, at Chicago, has been appointed superintendent of the Northern district—Chicago division, succeeding A. J. Van Valkenburg, resigned. F. W. Urbahns, trainmaster at Fond du Lac, Wis., succeeds C. E. Urbahns, and C. L. Leighty succeeds F. W. Urbahns.

Daniel W. Dinan, whose appointment as superintendent of the Mohawk division of the New York Central & Hudson River, with office at Albany, N. Y., has been announced in these columns, was born November 14, 1866, at Whiteport, N. Y. Mr. Dinan graduated from New Paltz Academy in 1883, and in December of the same year began railway work on the West Shore Railroad. In November, 1900, he was appointed trainmaster on the Pennsylvania division of the New York Central & Hudson River, and in September of the following year was appointed chief trainmaster of the same division. He was appointed assistant superintendent in May, 1904, and was promoted to superintendent of the Pennsylvania division in May of the following year, which position he held at the time of his recent appointment as superintendent of the Mohawk division.

M. G. McInerney, whose appointment as assistant superintendent of the Buffalo & Rochester division of the Buffalo, Rochester & Pittsburgh, with office at East Salamanca, N. Y., has been announced in these columns, was born May 24, 1868, at Meadville, Pa. He was educated in the public schools and at Salamanca-Rochester Business University, at Rochester, N. Y. Mr. McInerney began railway work as a call boy on the Erie Railroad at Salamanca August 1, 1881, and in March, 1883, was appointed a telegraph operator on the Western New York & Pennsylvania, now a part of the Pennsylvania Railroad. In August, 1887, he was appointed switchman at Rochester on the Buffalo, Rochester & Pittsburgh, and the following year was made assistant yardmaster, becoming general yardmaster in December, 1888. In December, 1903, he was appointed trainmaster at East Salamanca on the same road, which position he held at the time of his recent appointment as assistant superintendent.

Richard G. Mathews, who has been appointed terminal superintendent of the Buffalo, Rochester & Pittsburgh, at Rochester, N. Y., was born July 7, 1862, at Marietta, Ohio, and was educated in the common schools. He began railway work in April, 1878, as a telegraph operator on the Marietta, Pittsburgh & Cleveland, now a part of the Pennsylvania. In 1885 he was appointed a despatcher on the Scioto Valley, now a part of the Norfolk & Western, and in November, 1888, was appointed chief despatcher of the Columbus, Hocking Valley & Toledo. In

December, 1890, he went to the Chicago & Eastern Illinois as trainmaster, and was promoted to superintendent in July of the following year. He went to the Buffalo, Rochester & Pittsburgh in April, 1893, as superintendent and was promoted to general superintendent in June of the following year. He then went to the Florida Central & Peninsula, now a part of the Seaboard Air Line, as chief despatcher, and was later made trainmaster, resigning from that company in 1901, to go to the Plant System as trainmaster. In 1902 he was appointed terminal superintendent of the Savannah Union Station Company, and in December of the following year he was appointed general yard master of the Buffalo, Rochester & Pittsburgh, at Rochester, which position he held at the time of his appointment as terminal superintendent at Rochester.

John J. McCann, who has been appointed superintendent of the Scranton division, with temporary jurisdiction over the Bangor & Portland division of the Delaware, Lackawanna & Western, with office at Scranton, Pa., as has been announced in these columns, was born in Scranton. Mr. McCann began railway work in 1871, as a brakeman on the Delaware, Lackawanna & Western, and when he was 17 years old was promoted to conductor on the same road. He remained in this position until 1883, when he was made yardmaster at Elmira, N. Y., and in 1888, he was promoted to passenger conductor on the Buffalo division. Mr. McCann was appointed a trainmaster of the same company in September, 1900, which position he held at the time of his recent appointment as superintendent of the Scranton division.

J. J. McCann.

J. F. Keegan, whose appointment as superintendent of the Baltimore & Ohio, with office at Wheeling, W. Va., has been announced in these columns, was born March 29, 1870, at Cleveland, Ohio, and graduated in June, 1885, from St. Columba's Academy, Cleveland. He began railway work in November, 1886, as a telegraph operator on the Cleveland, Cincinnati, Chicago & St. Louis, and then left that company to go to the Cleveland, Lorain & Wheeling, now a part of the Baltimore & Ohio, as a telegraph operator in June, 1890, the following November he was appointed train despatcher at Canal Dover, Ohio. Mr. Keegan was promoted to chief train despatcher in May, 1902, and in September of the following year, was appointed assistant trainmaster at Cleveland. In December, 1904, he was transferred in the same capacity to Wheeling, W. Va., and in September, 1906, he was promoted to trainmaster at Parkersburg. He was transferred to Keyser as trainmaster of the Cumberland division in December, 1910, which position he held at the time of his recent appointment as superintendent.

J. F. Keegan.

Traffic Officers.

W. L. Louis has been appointed traffic manager of the Elgin, Joliet & Eastern, with office at Chicago, succeeding F. E. Learned, resigned to engage in other business.

W. H. Richmond has been appointed traveling passenger agent of the Missouri Pacific-Iron Mountain system, with office at Pittsburgh, Pa., succeeding H. C. Young, resigned.

H. B. Herrington has been appointed a soliciting agent of the Tennessee Central, with office at St. Louis, Mo., succeeding James G. Larkin, resigned to engage in other business.

A. O. Ellis has been appointed a traveling passenger agent of the Wheeling & Lake Erie, with office at Cleveland, Ohio, succeeding Charles Hamilton, resigned to accept service with the Wabash.

M. C. Bradley has been appointed a contracting agent of the Lackawanna Fast Freight Line, with office at St. Louis, Mo., succeeding W. J. Keane, resigned to accept service with another company.

J. I. Johnson has been appointed a general agent of the Chicago, Rock Island & Pacific, with office at Amarillo, Tex., succeeding A. B. Spencer, resigned to accept service with another company.

George B. Huget has been appointed traveling freight and passenger agent of the Chicago & Alton, Minneapolis & St. Louis and Iowa Central, with office at Peoria, Ill., succeeding W. B. Gibbs, resigned.

T. J. McGeoy, agent of the Lackawanna Fast Freight Line at St. Louis, Mo., has been appointed assistant general western freight agent of the Delaware, Lackawanna & Western, with office at Chicago, a new position.

A. F. Sullivan, traveling freight agent of the Chicago & Alton and the Toledo, St. Louis & Western at Minneapolis, Minn., has been appointed a commercial agent, with office at Minneapolis, and his former office has been abolished.

Walter S. Turner has been appointed a commercial agent of the Chicago & Alton and the Toledo, St. Louis & Western, with office at Little Rock, Ark., succeeding Joe A. Shearn, traveling freight agent, resigned, and the office of traveling freight agent has been abolished.

F. R. McMillan, traveling passenger agent of the Southern Railway at Norfolk, Va., has been appointed district passenger agent, with office at Houston, Tex., a new position. M. H. Bone, district passenger agent at Birmingham, Ala., has been transferred to Dallas, Tex.

Jesse J. McLane, city passenger and ticket agent of the Illinois Central, at Cincinnati, Ohio, has been appointed a traveling passenger agent, with office at Cleveland, succeeding Perry A. Marr, promoted. F. D. Caddy, assistant city passenger agent, at Cincinnati, succeeds Mr. McLane.

P. E. Ahern, city freight agent of the Delaware, Lackawanna & Western, at Brooklyn, N. Y., has been transferred to New York City. J. F. Rydene, contracting agent, at New York City, succeeds Mr. Ahern, and H. A. Klase succeeds Mr. Rydene. J. A. McTague has been appointed a traveling freight agent, with office at New York City.

George H. Bower, assistant general passenger agent of the Illinois Central and Indianapolis Southern, at Chicago, has been appointed general passenger agent of the southern lines of the Illinois Central and Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding J. A. Scott, deceased. A sketch of Mr. Bower's railway life was published in the *Railway Age Gazette,* March 3, page 432. J. V. Lanigan, chief rate clerk in the Chicago office, succeeds Mr. Bower.

H. A. Jackson, assistant general freight and passenger agent of the Great Northern at Portland, Ore., has been appointed assistant traffic manager, with office at St. Paul, Minn., succeeding W. P. Kenney, promoted. Archibald Gray, assistant general freight agent at Seattle, Wash., succeeds Mr. Jackson, and H. A. Kimball, assistant general freight agent at St. Paul, succeeds Mr. Gray. W. J. Power, general agent in the freight department

at Duluth, Minn., has been appointed an assistant general freight agent, with office at St. Paul, Minn., and H. R. Carl succeeds Mr. Power at Duluth.

Engineering and Rolling Stock Officers.

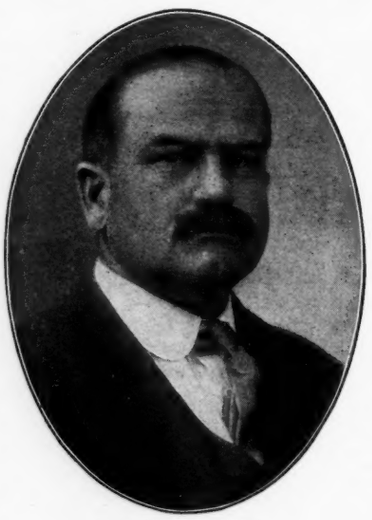
A. E. Harvey, division engineer of the Kansas City Southern, at Mena, Ark., has resigned to become chief engineer of the Metropolitan Street Railway of Kansas City, Mo.

S. S. Morton has been appointed an assistant engineer of the Kansas City Southern, with office at Mena, Ark., succeeding A. E. Harvey, division engineer, resigned to accept service elsewhere. C. L. Wallace has been appointed an office engineer at Kansas City, Mo.

M. Donahue, roadmaster of the Chicago & Alton, at Bloomington, Ill., has been appointed general supervisor of roadway and structures, with office at Bloomington, a new position; and the offices of roadmaster and of supervisor of bridges and buildings of the northern and southern divisions have been abolished.

George T. Hand, who was recently appointed division engineer of the Delaware, Lackawanna & Western, with office at Hoboken, N. J., as has been announced in these columns, was born in 1872 at Elizabeth, N. J. Mr. Hand began railway work in 1889, as chainman on the National Docks Railway, and in 1900 he went to the Delaware, Lackawanna & Western as assistant engineer. He was promoted to terminal engineer on November 1, 1909, which position he held at the time of his recent appointment as division engineer of the Morris & Essex division.

Curtis Edward Knickerbocker, whose appointment as chief engineer of the New York, Ontario & Western, with office at Middletown, N. Y., has been announced in these columns, was born November 17, 1867, at Morrisville, Madison county, N. Y. He attended Cazenovia Seminary and graduated from Princeton University with the degree of civil engineer in 1891. The same year he began railway work as a draftsman in the office of the chief engineer on the New York, Ontario & Western, at Middletown, remaining in that position until March, 1893, when he was appointed an assistant engineer at Norwich, N. Y. In January, 1902, Mr. Knickerbocker was promoted to engineer of maintenance of way, with office at Middletown, which position he held at the time of his recent appointment as chief engineer of the same company.



C. E. Knickerbocker.

Special Officers.

Louis P. Harris, formerly advertising manager of the Cincinnati, Hamilton & Dayton, has been appointed assistant advertising manager of the St. Louis & San Francisco, with office at St. Louis, Mo.

F. G. Athearn, superintendent of railway clubs of the Southern Pacific at San Francisco, Cal., has been appointed manager of the bureau of economics, with office at San Francisco, Cal., a new position. F. T. Scott succeeds Mr. Athearn, and the office of assistant superintendent of railway clubs is abolished.

OBITUARY.

Richard H. Williams, until the first of this year treasurer of the Chicago & North Western, died on April 12 at his home, Mount Vernon, N. Y., of heart disease. He has been ill about a week. Mr. Williams was 63 years old.

Railway Construction.

New Incorporations, Surveys, Etc.

Aberdeen & Asheboro.—A new branch has been opened from Candor, N. C., southward to Ellerbe, 17.5 miles.

Atchison, Topeka & Sante Fe Coast Lines.—The Wahtoke district has been opened for business from Reedley, Cal., west to Piedra, 16 miles.

The Laton & Western has been opened for business from Laton, Cal., west to Lanare, 15 miles.

It is reported that this company will build a cut-off on the San Francisco division from a point near Victorville, Cal., north to a connection with the branch at Hinkley.

Atchison, Topeka & Santa Fe.—An officer writes regarding the reports that a cut-off is to be built from Dodge City, Kan., to southwestern Kansas and the panhandle of Texas to Colmor, N. Mex., that nothing has been done in regard to such a proposition except a preliminary survey. There is no prospect of the construction of such a line in the immediate future.

Antioch & Stockton (Electric).—See Oakland, Antioch & Eastern (Electric).

Badger Railway & Light Co.—An officer writes that grading work has been finished from Whitewater, Wis., southeast to Lake Geneva, 22 miles. H. B. Kamschulte, president, Milwaukee. (March 3, 1911, p. 433.)

Baltimore & Ohio.—According to press reports contracts for nearly 35 miles of second track work on the main line of the Chicago division have been let.

Bellingham-Skagit Interurban.—This company, it is said, will build a line from Bellingham, Wash., to Mount Vernon, 22 miles, thence to Everett. The Stone & Webster Engineering Corporation, Boston, Mass., is back of the project.

Bloomington Southern.—See Indianapolis Southern.

Brinson Railway.—This road has been extended from Mill Haven, Ga., to Sardis, 5 miles.

Canadian Pacific.—On the Saskatchewan division a new line has been opened for business from Macklin, Sask., on the Battle River subdivision, to Kerrobert, 46 miles.

Chesapeake & Ohio.—The Paint Creek branch of the Kanawha district has been extended to Kingston, W. Va., which is six miles beyond Mahan.

Chicago, Rock Island & Pacific.—An officer writes that it has been decided to build under the name of the St. Paul & Kansas City Short Line from Carlisle, Iowa, south to Allerton. The company has definitely decided upon the location between Carlisle and Dallas, but between Dallas and the Missouri River division it has not been definitely decided at what point the line would join that division or through what towns it would pass. Bids are now being asked for, and it is expected to let contracts about April 20, so that work can be started this month. The work will be very expensive, the line passing through a rough country. Maximum grades will be 0.8 of 1 per cent. compensated for curves, maximum curves 3 deg. The estimated cost of building the line is $60,000 a mile. There will be a number of short plate girder bridges, also some short but high trestle bridges and ordinary station buildings. This is to be essentially a coal line, the Rock Island owning large bodies of coal land which it will develop at once, the line will also carry coal for other operators. When the line is built in connection with the St. Paul & Des Moines it will form a through and very important line for the Rock Island between St. Paul, Minn., Minneapolis, and the northwest, and Kansas City, Mo., and the company's line to California and to the gulf. It will be by far the shortest line between Minneapolis, St. Paul and Kansas City. It will be well built and will be an important passenger and freight line between the points named. (January 27, p. 183.)

Clinton, Oklahoma & Western.—This company, which operates a line from Clinton, Okla., to Butler, 21.5 miles, is said to have made definite arrangements to build an extension into the Texas Panhandle.

Corvallis & Alsea River.—See Portland, Eugene & Eastern (Electric).

Denver, Northwestern & Pacific.—The bill which was introduced in the Colorado legislature to provide for the construction by the state of the Continental Divide tunnel on the D., N. W. & P., has been passed by the House. The measure now goes to the Senate for action. The bill authorizes the state to issue bonds to the amount of $4,000,000 to be used in the construction of a tunnel through the Rocky mountain range at James Peak. The tunnel will be used by the Denver, Northwestern & Pacific. The railway is to put up a bond guarding the state against loss. (February 17, p. 334.)

Detroit, Bay City & Western.—This company, which operates a freight line from Bay City, Mich., to Carrol, 28 miles, recently opened the line for passenger traffic.

Eastern Utah.—Contracts have been let and grading work is under way on the first section of 20 miles of this line. The company was organized to build from Wellington, Carbon county, Utah, southwest to Emery, 60 miles. Henry Wade, president, Price. (March 3, p. 433.)

Grand Trunk Pacific.—An officer sends us the following particulars of the work the company expects to carry out this year:

Grading—

Main Line.

Prairie Creek to Tete Jaune Cache	114 miles	
Copper River to Aldermere	140 "	
		254 miles

Branches.

Calgary Branch (to complete)	117 miles	
Battleford Branch (to complete)	28 "	
Regina Branch (to complete)	30 "	
Regina-Boundary Branch (to complete present contract)	40 "	
Regina-Moose Jaw Branch (to complete)	35 "	
Prince Albert Branch (to complete)	59 "	
Alberta Coal Branch (to complete)	48 "	
New branch off same (new contract)	25 "	
Biggar-Calgary Branch (new contract)	50 "	
		432 miles
Total		686 miles

Tracklaying—

Main Line.

Prairie Creek to Tete Jaune Cache	114 miles	
Copper River to Aldermere	140 "	
Calgary Branch	117 "	
		371 miles

Branches.

Battleford Branch	48 miles	
Regina Branch	58 "	
Regina-Boundary Branch	90 "	
Regina-Moose Jaw Branch	40 "	
Prince Albert Branch	87 "	
Alberta Coal Branch	54 "	
		377 miles
Total		748 miles

It is also the intention of the company to put up 140 station buildings. The report that the company is going to construct 100 hotels is inaccurate.

Houston & Texas Central.—Surveys are said to be under way for a cut-off between Giddings, Texas, and Stone City, about 50 miles.

Indianapolis Grade Changes.—In connection with the proposition to make extensive elevation of railway tracks in the city of Indianapolis, Ind., for the purpose of eliminating grade crossings, the engineers of a number of the principal railways have made tentative proposals which have been submitted to the city engineer, for the construction of lines around the city, which would permit of the abandonment of some of the lines which are included in the plans for elevation. The map which has been made shows a line starting at the Lake Erie & Western tracks, near Castleton, and running southeast to the intersection of the tracks of the Indianapolis division of the Big Four, west of Lawrence. It would then run south to the intersection of the Peoria & Eastern west of Hunters station, continuing south to the tracks of the Pennsylvania about two miles east of Irvington. Continuing south the line intersects the C., H. & D. about two miles east of Irvington, then it runs south to the Cincinnati division of the Big Four, near Beech Grove. Trains from the various roads mentioned would then come into the city from Beech Grove on the Cincinnati division of the Big Four. A second proposed new line would start at the Monon tracks, north of Broad Ripple, and run southwest, intersecting the Chicago division of the Big Four about 1½ miles south of New Augusta. With east and north lines coming into the city over two lines, track elevation would be reduced materially. The Pennsylvania lines running south and west would not be affected by the proposed scheme.

Indianapolis Southern.—Steps are being taken by residents of Bloomington, Ind., to extend the Bloomington Southern from the present terminal south of Bloomington, south through the stone belt of Monroe county into Lawrence county, about 15 miles. Options on the right-of-way have already been secured.

Iowa City, Ottumwa & Southwestern (Electric).—An officer writes that contracts will be let about June 1 to build this line. The plans call for building from Iowa City, Iowa, southwest to Ottumwa, 70 miles. The work will include a 444-ft. steel bridge. A contract for a power house has been let to the B. J. Arnold Co. Frank Tanner, president, Iowa City. (See Iowa City-Ottumwa Interurban, March 31, p. 813.)

Johnstown Railroad (Electric).—Incorporated in New York with $300,000 capital, to build from Johnstown, N. Y., west to Little Falls, 27 miles. L. O. Bucklin, Little Falls; J. P. Argersinger, Johnstown, and H. D. Harmickell, New York, are directors.

Kansas City Southern.—An officer writes that a contract has been given to Porter Brothers, Spokane, Wash., for carrying out improvement work on seven short changes of line. The work calls for grade reduction, from 1 per cent. to 0.5 per cent., on a total distance of about 25 miles.

Laton & Western.—See Atchison, Topeka & Sante Fe Coast Lines.

Milwaukee Northern (Electric).—An officer is quoted as saying that the grading for the proposed extension from Sheboygan, Wis., southwest to West Bend, about 35 miles, will be started this coming fall. Considerable double-tracking work on the present line between Milwaukee and Sheboygan will be carried out during the spring and summer.

Nebraska Transportation Company.—Organized in Nebraska to build from Omaha, Neb., northwest to Elk City, from which point one line is to be built north to Sioux City, Iowa, 98 miles, and another line is to be built from Elk City, northwesterly to Norfolk, about 100 miles. Right-of-way has been secured for 60 miles and contract for building the line has been let to the Baker Construction Company, Omaha.

Nevada Copper Belt.—This road has been extended from Mason, Nev., to Hudson, 14.2 miles, and a new branch, called the Smelter branch, has been opened for business from Wabuska, to Thompson, 2.5 miles. (February 24, p. 369.)

New Orleans, Mobile & Chicago.—This company is making a survey from Middleton, Tenn., the present northern terminus, north to Jackson, 40 miles, and plans to extend to that point as soon as arrangements for financing the work can be made. President Berg says it will cost about $800,000 to build the road into Jackson. The people of Jackson plan to raise $100,000 for the undertaking, and will take stock in the company in return, arrangements for securing the remainder have not been completed. It is the intention to extend the road ultimately north to the Ohio river. Definite plans for reaching the river have not been decided upon, but will probably include trackage rights over the Illinois Central to Milan and then construction to Paducah or some other river point. At Middleton the road connects only with the east and west line of the Southern Railway. When it reaches Jackson it will have better connections to the north over the Illinois Central, Mobile & Ohio, and the Nashville, Chattanooga & St. Louis. (March 3, p. 434.)

Nooksack Valley Traction.—This company will build an extension, it is said, from Bellingham, Wash., northwest via Marietta to Ferndale, about 10 miles. The line is to be extended eventually to Blaine. (December 16, p. 1167.)

North Coast.—See Oregon-Washington Railroad & Navigation Company.

Oakland, Antioch & Eastern (Electric).—Incorporation has been asked for in California by this company. The plans include taking over the Antioch & Stockton, which has been build-

ing an electric line from Antioch, Cal., southwest to Oakland, 30 miles, now nearing completion, and to build an extension from Antioch, east to Stockton, about 50 miles. The directors include: A. W. Maltby, Concord; J. R. Selby, S. L. Naphthaly, L. Arnstein and A. J. Krutmeyer, San Francisco.

Oregon Roads.—The Booth-Kelly Lumber Company is said to be asking for bids to build a logging line 3.5 miles long, above Wendling, Ore.

Oregon Short Line.—According to press reports, contracts are to be let soon for building about 50 miles of the Raft River branch. The line is to be built southwest from Burley, Idaho, through the Raft river country.

An officer writes that track has been laid on about 0.5 mile on a line from Caldwell, Idaho, west to Greenleaf, 11.2 miles.

Oregon-Washington Railroad & Navigation Company.—A contract is said to have been given to the Watson, Flagg & Standifer Co., Portland, Ore., for building an 18-mile section on the North Coast, between Spokane, Wash., and Cheney. It is estimated that the work, which will be difficult, will cost $1,000,000.

Pensacola, Mobile & New Orleans.—An officer writes that this company, which was organized to build from Pensacola, Fla., northwest to Mobile, Ala., 60 miles, expects to have the line in operation to the east side of the valley of the Mobile river by December of this year. The grading and bridging to that point is nearly finished and one-third of the track has been delivered at the yard at Pensacola. Some preliminary work is being carried out for the bridge over the Mobile river, but nothing will be done on this structure until December. (October 14, p. 712.)

Pennsylvania Roads.—H. W. Hamblin, Harrisburg, Pa., is said to be back of a project to build a line from near Biglerville, southwest via Arendtsville to Cashtown, about ten miles.

Portland, Eugene & Eastern (Electric).—This company has bought the Corvallis & Alsea River, operating a logging line between Corvallis, Ore., and Monroe. It is the intention of the new owners to electrify the line and build an extension.

Southern Railway & Navigation Company.—An officer writes that this company has work under way on an extension of 11 miles, and that the plans call for building at some later time a further extension of 50 miles. The company now has in operation a line from Vidalia, Miss., southwest to Crooksville, 13.8 miles.

St. Paul & Kansas City Short Line.—See Chicago, Rock Island & Pacific.

St. Paul & Des Moines.—See Chicago, Rock Island & Pacific.

Union Pacific.—The contract for building the extension between Northport, Neb., and Gering, has been let to Shirley & Phelan, Omaha. (March 3, p. 434.)

Western Pacific.—This company will spend $2,000,000 reballasting its roadbed through the Feather river canyon, Cal., it is said, to prevent further trouble from snow slides. In Keddie a masonry retaining wall will be constructed.

Tenders for the construction, equipment, and operation of the railway from Madrid, Spain, to Valencia, were opened on March 17 at the Ministry of Public Works, Madrid, and the contract was awarded to a combination of American and British capitalists and promoters under the name of the Spanish Railway Co., London, England. The alternative of electric traction, left optional in the conditions submitted by the government, was not considered in the bid accepted, steam traction alone being provided for. The field of operations of the company in Spanish railway construction and development is apparently not limited to the railway under notice, but includes also the building of the new line between Madrid and Bilbao, which it is proposed to construct on the same gage as the French trunk lines so as to establish direct through communication between Madrid and Paris without necessitating present transshipments of all passengers and freight traffic at the frontier.

Railway Financial News.

Alberta Railway & Irrigation.—The Canadian Pacific offers until May 1, 1911, to buy at $153 per share, the minority stock of the Alberta Railway & Irrigation, on condition that the holders of 8,000 shares consent to sell.

Boston & Maine.—The Connecticut River Railroad, a subsidiary of the B. & M., has asked permission of the Massachusetts Board of Railroad Commissioners for authority to buy the franchises and property of the Vermont Valley Railroad, which it now controls through stock ownership.

Chicago, Indianapolis & Louisville.—This company has sold to Potter, Choate & Prentice, New York, $2,300,000 refunding mortgage 4 per cent. bonds, due 1947. These bonds were issued to retire a like amount of Louisville, New Albany & Chicago (Chicago and Indianapolis division) first mortgage 6s, due August 1, 1911. On that date the refunding 4s will become an absolute first mortgage on the entire mileage owned by the company, aggregating 509 miles of road.

Chicago, Milwaukee & Puget Sound.—This company, operating the Pacific coast extension of the C., M. & St. P., has called a stockholders' meeting for May 31 to vote on the question of increasing the capital stock from $100,000,000 to $200,000,000. All of the stock except directors' shares is held by the St. Paul.

Cleveland & Pittsburg.—A stockholders' meeting has been called for June 15 to vote on the question of authorizing an increase in the capital stock of the company from $22,000,000 to $40,000,000; the additional stock to be issued to the Pennsylvania Railroad, which leases the property for the Cleveland & Pittsburg.

Connecticut River Railroad.—See Boston & Maine.

Detroit, Toledo & Ironton.—In proceedings being brought by the trustees of the $4,250,000 first and second lien bonds looking to a foreclosure sale of the property under these bonds, the representatives of the junior bond issues have asked for and been granted a postponement of two weeks. In the junior bondholders' petition it was said that under the plan of reorganization which they had worked out, the company would receive $10,000,000.

Indianapolis Southern.—The property of this company is to be sold under foreclosure on May 5. The upset price is fixed at $2,500,000.

Intercolonial Railway.—The minister of railways and canals of Canada, says that during the Easter recess of the Canadian parliament the department of railways and canals will take up the question of acquiring the branch lines now operated independently as feeders of the Intercolonial. A statute has already been passed permitting such a purchase.

Knoxville, Sevierville & Eastern.—A suit has been brought asking for the removal of W. J. Oliver as receiver of this road. The road runs from Knoxville, Tenn., to Sevierville, 30 miles.

Maine Central.—This company has sold to F. S. Moseley & Co. $1,500,000 one-year 4 per cent. notes, dated April 1, 1911. The proceeds will be held to pay off in cash the $1,500,000 5 per cent. four-year notes maturing June 1.

Missouri Pacific.—H. I. Miller, receiver of the Buffalo & Susquehanna and formerly president of the Chicago & Eastern Illinois, has been appointed to make a physical valuation of inspection of the Missouri Pacific.

New York Central & Hudson River.—See West Shore.

Norfolk Southern.—A quarterly dividend of half of 1 per cent. has been declared on the $16,000,000 stock, payable May 1. The initial quarterly dividend of half of 1 per cent. was paid February 1, 1911.

Pennsylvania Railroad.—The directors have announced a stock allotment of 10 per cent. to stockholders of record May 5 at par. Stockholders may subscribe for the new stock between May 31 and June 5.

The amount of stock outstanding on March 1 was 8,252,324 shares, of par value $412,616,200. The amount of stock on which the 10 per cent. allotment will be made to stockholders of record May 5 will not be greatly different from that of March 1, in which case the amount of new stock issued will be $41,261,620. The total amount of stock outstanding after the allotment is complete will be about $454,000,000. The Pennsylvania warrants were listed in New York Wednesday afternoon. The opening sale was 160 at 105⅝. See Cleveland & Pittsburg.

PITTSBURG, CINCINNATI, CHICAGO & ST. LOUIS.—At the stockholders' meeting on April 11, D. T. McCabe, G. L. Peck, John P. Green and S. Stuart Patterson were elected additional directors.

PITTSBURGH & LAKE ERIE.—This company, which is a subsidiary of the New York Central's Lake Shore & Michigan Southern, earned gross in 1910 $17,052,698, an increase over the gross of 1909 of $2,213,750. Net, after the payment of expenses, last year amounted to $9,106,631, an increase over 1909 of $686,889. The operating ratio last year was 46.60, as against 43.26 the year before. The company operated the same mileage in 1910 as in 1909, namely, 191 miles. There was issued during the year $6,000,000 additional capital stock, making the total capital stock outstanding at the end of 1910 $21,000,000, leaving a balance of $9,000,000 authorized stock unissued. The funded debt of the road is $4,000,000. After the payment of interest, rentals, 10 per cent. dividends, and $4,864,091 for additions and betterments and additional equipment, the company had a surplus of $1,225,816 in 1910. In the previous year, after the payment of 10 per cent. dividends, the company had a surplus of $6,115,605, but in 1909 nothing was charged against income for additions and betterments or additional equipment.

Operating expenses last year amounted to $7,946,066, an increase of $1,526,861 over 1909. Of this increase, $793,404 was an increase in transportation expenses.

In 1910 revenue ton miles totaled 2,006,824,483, an increase over 1909 of 212,077,679. The tons of revenue freight carried one mile per mile of road (freight density) amounted last year to 10,493,200. The average haul of revenue freight was about the same last year as the year before, 64 miles. The average train load was 1,207 tons, an increase in 1910 over the impressively high figure of 1909 of 15 tons. The average revenue per ton per mile in 1910 was 7.48 mills, and in 1909 7.29 mills.

Of the total tonnage, 31,378,435 tons, of freight moved by the P. & L. E. in 1910, 11,181,850 tons was bituminous coal and 6,093,188 tons was coke. The increase in bituminous coal tonnage was about 17 per cent.

The two most important developments of the year for the Pittsburgh & Lake Erie were the traffic agreement for 99 years made with the Western Maryland, which has during the past year built a 90-mile line from Cumberland, Md., to Connellsville, W. Va., forming a connection with the Pittsburgh & Lake Erie, and the new agreement ratified since the close of the calendar year, but negotiated during the past year, by which the P. & L. E. has been given trackage rights over the Erie's New Castle-Sharon branch; and the Erie has begun to actively solicit business in the Pittsburgh district for haul over the P. & L. E. to a connection with its own lines.

RUTLAND RAILROAD.—This company, operating 468 miles of railway and controlling the Rutland Transit Co., which operates a line of steamers from Ogdensburg, N. Y., through the Great Lakes to Chicago, has been controlled by the New York Central & Hudson River. A short time ago the New York Central sold half of its majority stock to the New York, New Haven & Hartford, so that now the Rutland is controlled jointly by the New Haven and the New York Central. This arrangement gives the New York, New Haven & Hartford its own entrance into Montreal.

In 1910 operating revenue of the Rutland amounted to $3,339,834, an increase over 1909 of $237,401. Operating expenses amounted to $2,356,256, an increase of $154,411 over 1909. Operating income last year, after the payment of taxes, was greater by $75,375 than in 1909 and totaled $861,656. The Rutland has outstanding an issue of about $9,000,000 cumulative preferred stock, and the provisions governing the issue of this preferred stock make it impossible for the company to issue new securities for capital expenditures until the cumulative dividend has been paid. No dividends have been paid for some years, and therefore the Rutland has been forced to make all improvements to its property from income. In 1910 $291,029 was appropriated for additions, betterments and improvements, and in 1909 $204,005, leaving a nominal surplus in both 1910 and 1909.

The total number of tons of revenue freight carried one mile was 253,285,609 in 1910, an increase of 9,186,863 tons. Freight density on the Rutland was 610,165 tons one mile per mile of road. The average haul last year was 119 miles, a shorter haul by three miles than the average for 1909. The average revenue train load was 271 tons, which is less by nine tons than the 1909 train load. Lumber, grain and miscellaneous manufactured articles form the bulk of the Rutland's freight traffic, and the tonnage of all of these commodities showed increases in 1910 over 1909.

SOUTHERN PACIFIC.—A press despatch from San Francisco says that this company has bought the entire holdings of L. E. Hanschet in the stock of the traction companies in the Santa Clare valley. The report says that this purchase gives the Southern Pacific control of three extensive electric railways.

ST. LOUIS & SAN FRANCISCO.—Speyer & Co., New York, have arranged for the sale to French bankers of $7,000,000, or about 35,000,000 francs, general lien 15-20 year 5 per cent. bonds. There are at present $10,000,000 of these general lien bonds listed on the parquet of the French Bourse. Of the bonds now sold, $5,443,000 are for refunding purposes, and $1,557,000 for additions and betterments.

TENNESSEE CENTRAL.—A formal decree has been entered dismissing the suits brought by the Illinois Central and the Southern Railway against the Tennessee Central, the matter under controversy having been settled out of court some time ago.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—At a meeting of the stockholders held on April 10, the following new directors were elected: F. H. Britton, St. Louis Southwestern; C. W. Galloway, Baltimore & Ohio Southwestern; C. S. Clarke, Missouri Pacific; C. R. Gray, St. Louis & San Francisco; W. L. Park, Illinois Central; F. O. Melcher, Chicago, Rock Island & Pacific. The following have been appointed members of the finance committee: George H. Ross, George E. Evans, W. L. Park, and Julius S. Walsh, chairman and ex-officio member. The following are on the executive committee: C. E. Shaff, T. C. Powell, Henry Miller, C. H. Middleton, A. A. Allen, Benjamin McKeen, C. R. Gray and W. S. McChesney, Jr., chairman and ex-officio member.

VERMONT VALLEY RAILROAD.—See Boston & Maine.

WEST SHORE.—The *Commercial & Financial Chronicle* says that in order to pave the way for a merger of the West Shore with the New York Central & Hudson River, a bill has been passed in the New Jersey legislature permitting the consolidation, so far as the property of the West Shore in New Jersey is concerned, of this company and the N. Y. C. & H. R. No new legislation, it is said, will be required in New York, the permission of the Public Service Commission, however, being necessary. While the merger has not been definitely decided on, the New York Central desires to obtain the necessary permission to do so should it wish in the future to carry out the plan.

FOREIGN RAILWAY NOTES.

Contracts for the extension of the Bagdad Railway, Asia Minor, to Bagdad, for the branch line from Osmanich to Alexandretta, and the construction of harbor works at Alexandretta were signed at Constantinople, Turkey, on March 21.

Higher passenger and freight rates on the State Railways of Chile will go into operation August 10, 1911. This increase of rates is due to the fact that during the past five years the State Railways have been operated at an average annual loss of $2,979,372.

Supply Trade Section.

The Chicago Steel Car Company, Chicago, is building a number of acid tank cars for the Pioneer Iron Company, Marquette, Mich.

The Whipple Car Company, Chicago, has opened an office at the Grand Central Terminal, New York, in charge of J. H. Burwell, eastern sales agent.

The Orton & Steinbrenner Company, Chicago, announces the appointment of W. Van R. Whitall, Inc., New York, as its representative in New York and England for the sale of locomotive cranes and grab buckets.

C. H. Pearson, of the Noera Manufacturing Company, Waterbury, Conn., has taken a position in the hoist department of the Yale & Towne Manufacturing Company, New York. Mr. Pearson's field will be in the West.

The Carnegie Steel Company, Pittsburgh, Pa., has leased the fifth and sixth floors of the Frick Annex, and is connecting them with the Carnegie building by two bridges across Relief alley. This new space will give the company about 50 additional offices.

Edward W. Snowdon, of the Union Spring & Manufacturing Company, Pittsburgh, Pa., died in New York on April 9. Mr. Snowdon was born in Cincinnati, Ohio, in 1863. He was formerly in the mechanical department of the Queen & Crescent; later with the American Car & Foundry Company, New York, and in 1908 he went to the Union Spring & Manufacturing Company.

The Smith locomotive adjustable hub plate, made by the Smith Locomotive Adjustable Hub Plate Co., Pittsburgh, Pa., has been fitted to one of the Pacific type passenger locomotives of the New York, New Haven & Hartford. The outside box trailer and engine truck wheels, as well as the driving wheels, are equipped with this device. The plate is in use on the Delaware & Hudson and on the St. Louis & San Francisco.

The McKeen Motor Car Company, Omaha, Neb., has shipped the thirtieth gasoline motor car for service on the Southern Pacific. A 70-foot car for the Sand Springs Interurban Railway, Tulsa, Okla., will leave the builder's plant on April 15. The Oregon-Washington Railroad & Navigation Company has ordered a second 70-ft. motor car which will be a duplicate of the one now under construction for that line. This road is now operating two 55-ft. McKeen cars.

The sales of the Western Electric Company, Chicago, for March were 10 per cent. larger than for the corresponding month of last year. During the first quarter of the calendar year to April 1, the company did 11 per cent. more business than in the same period of last year. This company now employs 25,000 persons, compared with 23,464 on January 1, 1911, and 17,835 on December 1, 1909. The present number is within 4,000 of the largest pay roll the company ever had.

The Detroit Steel Products Co., Detroit, Mich., reports the following recent installations of Fenestra steel sash in railway buildings: Pennsylvania Railroad roundhouses at Frankfort, Pa., and Orangeville, Md., N. Y. C. & H. R. shops at West Albany, N. Y.; M. K. & T. freighthouse at St. Louis, Mo.; Duluth, Missabe & Northern shops at Proctor, Minn.; St. Louis & Southwestern shops at Tyler, Texas; Chicago & North Western shops at Kankakee, Ill.; new terminal and power station at St. Paul, Minn.; Northern Pacific freighthouse at St. Paul, Minn.; Interborough Rapid Transit car terminal buildings, at New York.

The Transportation Utilities Company, 30 Church street, New York, has been organized to represent directly the Acme Supply Company, Chicago, and the General Railway Supply Company, Chicago. The territory in the steam railway field will cover all roads running east of Chicago and St. Louis, Mo., and in the electric railway field will cover the United States, Canada and Mexico. The company will be represented in Baltimore, Md., by H. B. Chamberlain, 704 North Fulton avenue; and in Chicago by John T. Morton, the Steger building. W. L. Conwell, of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is president and treasurer.

TRADE PUBLICATIONS.

Files.—The Nicholson File Company, Providence, R. I., has published a 90-page catalog illustrating in actual sizes the different types and designs of files made by that company.

Electrification.—The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has published in a small illustrated booklet all the Railroad Electrification Talks which recently appeared in the advertising pages of the *Railway Age Gazette.*

Engines.—The American Blower Co., Detroit, Mich., has devoted bulletin No. 288 to its vertical self-oiling engines, types A and E. This bulletin supersedes bulletin No. 232 and gives detailed descriptions, diagrams and dimension tables.

Text-Books.—John Wiley & Sons, New York, have issued a 200-page catalog of text-books published by them. Among the subjects covered are civil engineering, mechanical engineering, electricity, physics and mechanics, pure and applied.

Car and Track Jacks.—Templeton, Kenly & Company, Ltd., Chicago, is distributing catalog No. 13, describing the Simplex jacks made by that company. These jacks are made in numerous types for use in track work and in shop repairs on cars and locomotives.

Missouri Pacific-Iron Mountain.—The passenger department of the Missouri Pacific-Iron Mountain Lines has published a booklet describing Little Rock, Ark., and Hot Springs, on account of the United Confederate Veteran's Reunion to be held in Little Rock, May 16, 17 and 18, 1911.

Queen & Crescent Route.—The passenger department has published under the title of, "From the Window," a 95-page illustrated booklet describing the scenery, industries and points of historic interest along this line. A brief description, including interesting data, is given of each town through which the road passes.

Bangor & Aroostook.—The passenger department of this company has published a 170-page booklet entitled "In the Maine Woods." This will prove valuable to the prospective camper in that region, as it points out the choicest spots for hunting, fishing, canoeing, etc., and includes the names of the best camps and guides.

Railway Motor.—The General Electric Co., Schenectady, N. Y. in bulletin No. 4817 illustrates and describes its 75 h. p. direct-current commutating pole railway motor. A form is included which when filled out will show the company just what service the motor is for so that the company can decide what type of motor would give the best results.

Nut Locks.—The various uses of nut locks in car construction are explained in a pamphlet issued by the Jones Positive Nut Lock Company, Chicago. The applications of this nut to trucks, arch bars, brake beams and truss rods are illustrated in the drawings, and tables of dimensions and prices are included. The Positive nut lock is also used in frog and crossing work.

Capt. John Smith and Carborundum.—Those who read the first two volumes of the Revised American Statesmen's Series, published by the Carborundum Company, Niagara Falls, N. Y., will be glad to hear that the third volume has appeared. This small booklet is even better than its predecessors, and tells in its unusually humorous and original way the hitherto unpublished facts about Capt. John Smith and Carborundum.

Concrete Surfaces.—The Universal Portland Cement Company, Chicago, has published a pamphlet on concrete surfaces, describing and illustrating the various types, such as the brushed, the rubbed, the tooled and the sand blasted surfaces. The costs of the different types are discussed and formulae for colored mortars are given. The colored plates, showing surfaces which were brushed to expose the aggregate, are particularly interesting.

RAILWAY STRUCTURES.

Anadarko, Okla.—The Chicago, Rock Island & Pacific has let contracts to T. S. Leake, Chicago, for building one-story and basement, brick veneer passenger stations at Anadarko and Lawton.

Anniston, Ala.—The Louisville & Nashville has prepared plans for improvements, including an enlargement to its roundhouse and the installation of a stationary boiler.

Bethlehem, Pa.—Residents of Bethlehem are back of a project to build a bridge over the Lehigh river at Bethlehem. It is understood that the bridge will carry tracks for street railways.

Bloomington, Ind.—See Hammond, Ind.

Comanche, Texas.—The St. Louis Southwestern has prepared plans for a passenger and freight station upon which work will be begun in a short time. The building will be of pressed brick with stone trimmings and tile roof. The estimated cost is $12,500.

Council Bluffs, Iowa.—The Chicago, Rock Island & Pacific has let a contract to Geo. B. Swift & Co., Chicago, for building a freight house and office building to cost about $100,000. The structure will be 40 ft. x 540 ft., of brick and re-enforced concrete construction.

Brownville Junction, Me.—Application has been made by the Canadian Pacific to the Maine railroad commissioners for permission to replace the single span 150-ft. truss bridge over the Pleasant river, near Brownville Junction with a double span plate girder bridge. The company has been surveying in that section for a new route with easy grades, but the application for the new bridge does not indicate any change of grade or location.

East St. Louis, Ill.—Bids are wanted up to noon, April 25, by H. D. Sexton, president of the board of trustees of the East Side Levee & Sanitary district for building five railway bridges along Cahokia creek diversion channel in Chouteau township, Madison county.

Fort Collins, Colo.—The Union Pacific has let a contract to Searle Bros., Denver, Colo., for building a brick roundhouse.

Grand Rapids, Mich.—The Pere Marquette has let a contract for building a 42-stall brick roundhouse.

Hammond, Ind.—The Chicago, Indianapolis & Louisville, according to local press reports, has prepared plans for new stations, at Hammond, Bloomington, and Rensselaer.

Hickman, Ky.—The Mississippi Valley Transportation Company plans to build a concrete dock to cost about $10,000.

Hollister, Cal.—Plans have been made by the Southern Pacific for putting up a new station at Hollister, to cost $18,000.

Lawton, Okla.—See Anadarko, Okla.

Ottawa, Ont.—The Grand Trunk will use the Bush train shed in its new terminal in Ottawa; the Canadian Railway Commission has given formal approval to the railway company for the use of this type of structure at the Ottawa terminal. The train shed will cover seven tracks, and is to be 530 ft. long. Six of the tracks in the shed will be stub-end tracks, and one will be a through track enclosed within the train shed structure, with the shed open at both ends for through movement on this track. To be effective, the smoke duct in the Bush shed must be close to the smoke stack of the locomotive, so the Canadian government clearance restrictions have heretofore prevented its use. The government approval of its use at Ottawa is an indication that restrictions may be removed at other stations in Canada.

Rensselaer, Ind.—See Hammond, Ind.

Rosalia, Wash.—The Chicago, Milwaukee & Puget Sound, it is understood, will build a steel bridge over Pine creek at Rosalia.

Southover Junction, Ga.—An officer of the Atlantic Coast Line is quoted as saying that improvements are to be made at a cost of $200,000, to include the erection of a roundhouse, a turntable and necessary offices at the yards south of Southover Junction. Some additional tracks are also to be put in.

Westby, Wis.—The Chicago, Milwaukee & St. Paul, it is said, will put up a new passenger station at Westby, in Vernon county.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Chicago, St. Paul, Minneapolis & Omaha is in the market for 12 locomotives.

The Carolina, Clinchfield & Ohio is said to be making inquiries for 5 Mallet locomotives and 2 Mikado locomotives.

The Chicago & North Western is said to be negotiating with the American Locomotive Company for 30 locomotives. This item is not confirmed.

The Western Maryland has ordered 30 consolidation locomotives from the American Locomotive Company, and 5 Mallet locomotives from the Baldwin Locomotive Works.

The Rutland has ordered 2 consolidation locomotives from American Locomotive Company. The dimensions of the cylinders will be 22 in. x 30 in., the diameter of the driving wheels will be 63 in., and the total weight in working order will be 211,000 lbs.

The Steel Company of Canada, Ltd., Hamilton, Can., has ordered 1 four-wheel saddle tank locomotive from the American Locomotive Company. The dimensions of the cylinders will be 17 in. x 24 in., the diameter of the driving wheels will be 50 in., and the total weight in working order will be 88,000 lbs.

The Pennsylvania Lines West have ordered 1 six-wheel switching locomotive from the American Locomotive Company. The dimensions of the cylinders will be 19 in. x 26 in., the diameter of the driving wheels will be 51 in., and the total weight in working order will be 139,000 lbs. This locomotive is for the Cincinnati, Lebanon & Northern.

CAR BUILDING.

The Grand Trunk, it is said, will build 10 first class coaches and 20 express cars at the company's shops.

The Texas Company, St. Louis, Mo., has ordered 200 tank cars from the American Car & Foundry Company.

The Spokane, Portland & Seattle is said to have ordered 14 baggage and mail cars. This item is unconfirmed.

The Chesapeake & Ohio, it is said, will build 1,300 freight cars at the company's shops. This item is not confirmed.

The Chicago, Milwaukee & St. Paul is negotiating with the American Car & Foundry Company for 8 baggage cars.

The Duluth, Missabe & Northern has ordered 6 coaches and 2 combination baggage and mail cars from the American Car & Foundry Company.

The Delaware, Lackawanna & Western, mentioned in the *Railway Age Gazette* of March 10 as being in the market for 3 combination baggage and buffet cars, has ordered this equipment from the American Car & Foundry Company.

IRON AND STEEL.

The Seaboard Air Line is reported in the market for 14,000 tons of rails.

The Japanese Government has ordered 3,900 tons of rails from the Carnegie Steel Company.

The Sandy Valley & Elkhorn has ordered 5,350 tons of rails from the Carnegie Steel Company.

The Richmond, Fredericksburg & Potomac has ordered 1,000 tons of rails from the Maryland Steel Company.

The Boston & Maine has ordered 1,200 tons of bridge steel from the Boston Bridge Company, and is in the market for 10,000 tons of bridge steel.

The Chicago, Milwaukee & St. Paul is said to have ordered 100,000 tons of rails from the United States Steel Corporation. This item is not confirmed.

The Harriman Lines have ordered 72,000 tons of rails. Of this order 40,000 tons will go to the United States Steel Corporation, being divided between the Illinois Steel Company and the Ten-

nessee Coal, Iron & Railroad Company. The remaining 32,000 tons will go to the Colorado Fuel & Iron Company.

General Conditions in Steel. There has been a falling off in orders since the first of the month, but the average daily orders of the Steel Corporation are still well above 30,000 tons. During the week cuts of several dollars a ton on fabricated steel have been reported. A large amount of business is pending, but consumers continue to hold off until the general outlook is more settled. The monthly report of the Steel Corporation as of March 31 shows that that month was one of the best in the history of the corporation, as far as earnings are concerned. About 950,000 tons were shipped and a trifle less than 1,000,000 tons were ordered during the month. The net earnings for the month must have been about $11,000,000, or $4,000,000 more than in December. The earnings for the first quarter are expected to be between $29,000,000 and $30,000,000. The unfilled orders on March 31 were 3,447,301 tons, a gain of 46,758 tons for the month and an increase of 772,544 tons during the first quarter of the calendar year. The March shipments, on a basis of 31 days, were at the rate of 30,750 tons a day, an increase of over 2,500 tons a day over the February shipments and an increase of over 7,450 tons a day over the January shipments. During March the Steel Corporation operated on an average of about 69 per cent. of its capacity. It is now operating at about 72 per cent. of its capacity.

SIGNALING.

Alternating Current Automatic Block Signals on the Cumberland Valley.

The first steam road to use automatic signals with alternating current for operating and lighting the signals, as well as supplying the track circuits was the Cumberland Valley. Signals thus worked, between Lemoyne and Mechanicsburg, seven miles, have recently been put in service.

Power for operating the system is supplied from a 2,200-volt, 25-cycle, single-phase, alternating current line carried on poles along the right-of-way, current being obtained from the power plant of the United Electric Company at Lemoyne. The line has lightning arresters at intervals of two miles and trouble from lightning has been confined practically to an occasional fuse blown out. The signals are three-position, upper quadrant, normal clear. The amount of energy used by the two-candle power electric lamps used to light the signal is so small that they are not put out in the day time.

Transformers are used at each signal location with suitable taps to step the voltage down from 2,200 to 55 volts for operating the signal motor and lights, and 5 volts for track circuits. The motors are of the induction type and have no contacts or brushes and no friction surfaces aside from the two armature bearings. The relays are of galvanometer type for track circuits with a Vane type for slow release control.

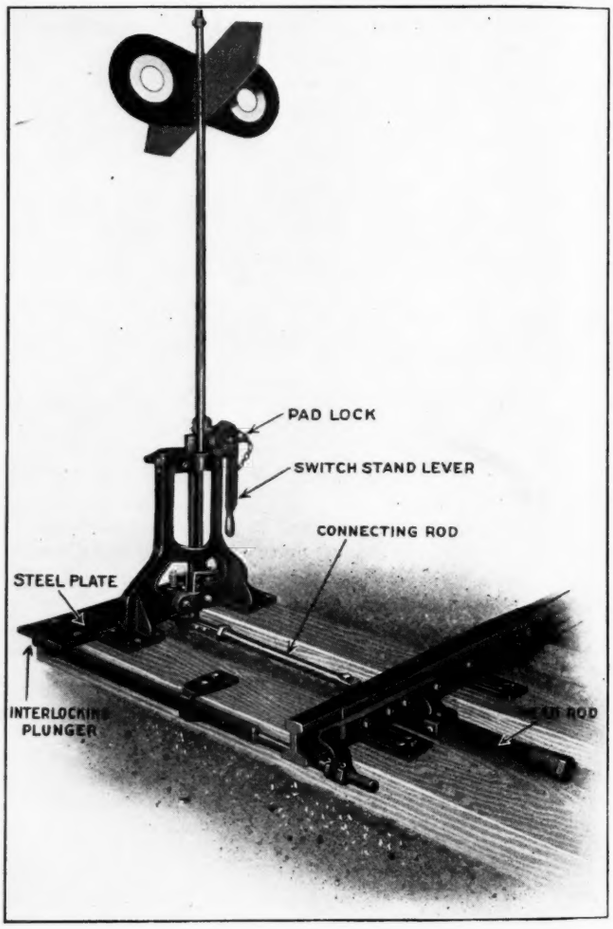
The polarized system of alternating current track circuits is used; this controls the third or clear position of the signals, without the use of line wires, so that the two main wires are the only line wires used in the automatic territory. Track circuits average one mile in length, the longest being 7,000 ft.

No batteries are used on any part of this automatic signal system and the maintenance expense is limited chiefly to the proper lubrication of the signal mechanism and the care of the rail bonds and insulated joints.

The operation of these signals has been so satisfactory that a contract has been awarded for signaling forty-three miles additional (double track), divided into three sections: Mechanicsburg to Mile Post 27, Shippensburg to Chambersburg, and west of Chambersburg to Mason-Dixon, together with the single track between Lemoyne and Harrisburg, a distance of about one mile, where the Susquehanna River is crossed by a single track bridge. Alternating current at 3,300 volts, 25-cycle, single-phase, will be used, with such modifications and improvements in the signals and equipment as have been made since the original installation, which was begun in 1908. It is the intention in these installations to carry sufficient current in the signal mains to supply electric lights at all the stations. This will be the first instance of such use of signal circuits on a steam road. The current supply for this signal and lighting system from Harrisburg to Mile Post 27 will be furnished by the United Electric Company, of Lemoyne, while the sections east and west of Chambersburg will be supplied from the power plant owned by the company at Chambersburg.

Interlocking Switch Stand.

The Anderson interlocking switch stand, made by the American Valve & Meter Company, of Cincinnati, Ohio, is shown in the accompanying illustration. It is of the skeleton type, and is furnished with either an intermediate or high target and ladder as desired. The construction is simple and practical, and all the parts are exposed so that any derangement may be quickly noted. The interlocking mechanism is independent of the switch stand, but is operated by it. The interlocking plunger is directly under the steel plate, which is provided for its protection. The switch lever has a throw of 180 deg.; the first 40 deg. releases the interlock without moving the switch point, and the remaining 140 deg. opens the switch and turns the target. The



Anderson Interlocking Switch Stand.

reverse movement closes the switch and locks it. The switch must be properly closed in order to be interlocked, for the plunger could not mesh with the interlocking bar and the switch stand lever would be 40 deg. from the slot in the switch stand plate in which it must fit in a vertical position in order to be locked. The switch must thus be positively closed, as even the width of a small chip will prevent the padlocking of the switch lever. Without the interlock the lever of this switch stand, like any other, could be forced into position and padlocked, leaving the switch point partly open, which is liable to cause an accident. If in closing the switch it should in any way become disconnected, the switch stand cannot be locked, as the interlocking bar is directly connected to the switch point. The interlock provides protection to the switch, even if the switch stand should be damaged or destroyed by accident, and prevents the switch from being opened if any other derangements should take place in the mechanism.